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THE PLANNING OF FEVER HOSPITALS

AND

Disinfecting and Cleansing Stations

By
ALBERT C. FREEMAN, M.S.A.
Author of "Planning of Poor Law Buildings and Mortuaries"
"Planning of Crematoria and Columbaria"
"Crematoria in Great Britain and Abroad"
Editor "The Architects' Directory
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PREFACE

THE object of this book is to provide a practical guide to the Planning of Fever Hospitals and Disinfecting Stations; and to place on record those principles which are invariably followed in the design of such buildings.

Part of this work has already appeared in the columns of *The Sanitary Record* and is now, by special arrangement, enlarged and reproduced in this volume.

The illustrations present a study from which considerable profit can be derived. It must be understood, however, that they do not comprise the whole of the hospitals of this country, many examples are unworthy of servile imitation; then, there being a great similarity in the general planning of fever pavilions, I have endeavoured to place before my readers the examples which contain exemplary points of interest.

In conclusion I have to thank the many Architects, Borough Engineers, Mr. T. Duncombe Mann, Clerk to the Metropolitan Asylums Board, and others for their valuable assistance in the preparation of the work.

ALBERT C. FREEMAN,
Architect.

72, FINSBURY PAVEMENT,
LONDON, E.C.

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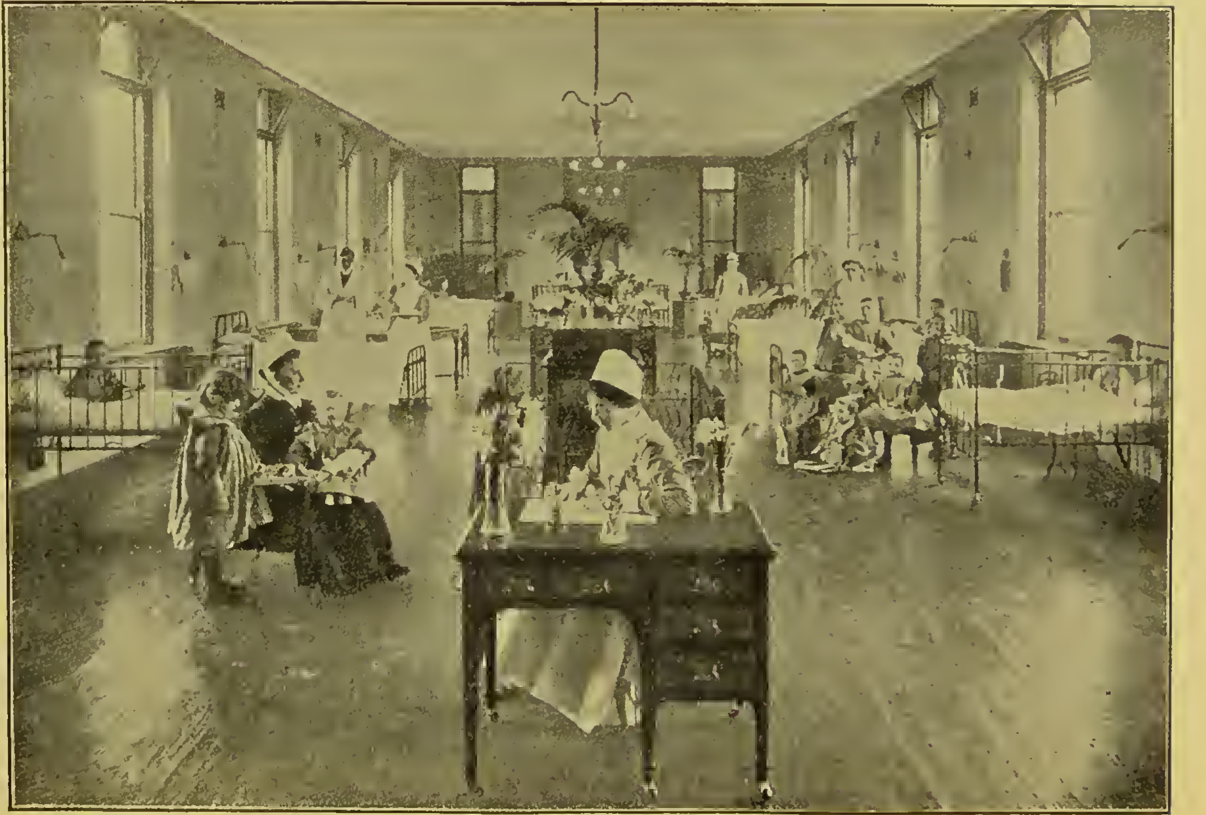
FAZAKERLEY HOSPITAL, LIVERPOOL.



INTERIOR OF WARD.

THE PLANNING OF FEVER HOSPITALS AND DISINFECTING AND CLEANSING STATIONS

INTRODUCTION.

The desirability of a work dealing exclusively with the provision, planning, and construction of Fever Hospitals, and of Disinfecting and Cleansing Stations has long been felt by Municipal and other public bodies. In order to give an increased interest to the work, we will first glance at the history and growth of sanitary reform in the treatment of infectious disease.

The Local Authorities obtained powers to build, or otherwise arrange for hospitals for infectious diseases, by the passing of the Sanitary Act of 1866. These powers were considerably increased by the Public Health Act, 1875, and the Isolation Hospitals Act, 1893. The former provides for Local Authorities making provision for the reception of the sick in their districts. It gives the power to build such hospitals or places of reception; to contract for the use of any hospital, or part of a hospital, or place of reception, or to enter into any agreement with any person having the management of any hospital, for the reception of the sick inhabitants of their district, on payment of such annual or other sum as may be agreed on. It also provides for two or more Local Authorities combining to provide a common hospital. By this Act Local Authorities may purchase land, erect buildings, furnish and maintain hospitals, the cost being defrayed by a local rate. This rate, however, is not to include "patients' expenses," which are described as the cost of removing and feeding the patients, providing medicines, disinfection, and all other things necessary for them.

Any expenses incurred by a Local Authority in maintaining in a hospital, or a temporary place for the reception of the sick (whether or not belonging to such Authority), a patient who is not a pauper, shall be deemed to be a debt due from such patient to the Local Authority, and may be recovered from him at any time within six months after his discharge from such hospital or place of reception, or from his estate in the event of his dying in such hospital or place. In the case of a pauper, the Guardians of the Union from which he is sent are charged with the patient's expenses.

Prevention Act, 1883.—In 1883 the Epidemic and other Diseases Prevention Act was brought into force as an amendment to the Public Health Act (England), 1875. It provides for the prevention of any threatened pestilence, such as epidemic, endemic, or infectious disease, and makes regulations for the following :—

A. The speedy interment or otherwise disposal of the dead.

B. House-to-house visitation.

C. Provision of medical aid and hospital accommodation.

D. The promotion of cleansing, ventilation, and disinfection, and guarding against the spread of the disease.

For the purpose of these regulations the Sanitary Authorities may borrow money, and the Local Authorities in England, charged with the carrying out of these regulations, may borrow, and the Public Works Loan Commission in England may lend money to such Authorities, as if such purposes were works for which loans may be granted under the Public Health Act, 1875, and such loans may be made forthwith and without any preliminary public notice or inquiry, if it appear to the Local Government Board desirable in order to the prompt and effective execution of such regulations.

The Infectious Disease (Prevention) Act, 1890.—Further precautions were taken to prevent the spread of infectious diseases by the Infectious Disease (Prevention) Act, 1860. This Act provides for, in addition to other matters, Local Authorities providing, from time to time, free of charge, temporary shelter, or house accommodation, with any necessary attendants, for the members of any family in which an infectious disease has appeared, who have been compelled to leave their dwelling for the purpose of enabling such dwellings to be disinfected by the Local Authority. Any expenses incurred by a Local Authority in the execution of any of the provisions of this Act shall be paid as part of the expenses of such Authority in the execution of the Acts relating to public health, and in the case of Rural Authorities shall be general expenses.

The Isolation Hospitals Act, 1893.—The Isolation Hospitals Act, 1893, was promoted to enable County Councils to establish hospitals for the reception of patients suffering from infectious diseases ; it is cited for all purposes as the Isolation Hospitals Act, 1893. This Act shall not extend to the administrative County of London, or to any county borough, or without the consent of the Council for the borough to any borough containing, according to the census for the time being in force, a population of 10,000 persons or upwards, or to any borough containing a less population, without the like consent, unless the Local Government Board by order direct that the Act shall apply to such borough. Under this Act the Council of every county, may on such application being made to them, and proof adduced, provide or cause to be provided in any district within their county a hospital for the reception of patients suffering from infectious diseases. An application to a County Council for the establishment of an isolation hospital may be made by any one or more of the Authorities, by this Act defined as Local Authorities, having jurisdiction in the county, or any part of the county. Such an application may be made in pursuance of a resolution passed at a meeting of any Authority by a majority of the members assembled thereat, and voting in a manner in which votes are required by law to be given at a meeting of the Authority. An application for the establishment of an isolation hospital may also be made by any number of ratepayers not less than twenty-five. Such application shall be made by petition, and shall state the district for which the isolation hospital is required, and the reasons which the petitioners adduce for its establishment.

When a hospital district has been constituted, a committee shall be formed by the County Council, which may consist wholly of members of the County Council, or partly of members of the County Council and partly of representatives of the local area or areas in the district or wholly of such local representatives.

A hospital committee has powers of acquiring land and providing a hospital by purchase or otherwise, and managing and maintaining the same when so provided. The County Council, however, retain the power of inspecting any hospital, and of raising money by loan for the purposes of such hospital.

Additional Accommodation.—A hospital may in expectation of, or in the event of an outbreak of any infectious disease, provide additional accommodation by hiring or otherwise acquiring any buildings, wooden houses, or other places for the reception of patients. They may, in addition to or instead of providing a central hospital, establish within their district hospitals in cottages or small buildings; they may also provide temporary accommodation should no permanent hospital exist.

C/e

Classification of Expenses.—The expenses incurred in respect to isolation hospitals under this Act are classified as follows:—

(1) Structural expenses, which include the cost of providing the hospital, the purchase of land, furnishing, permanent extension, or enlargement or alterations or repairs to the hospital, or drainage and structural repairs. It shall not, however, include ordinary repairs, painting, cleaning, or renewal, or keeping in order of furniture, or the supply of new furniture.

(2) Establishment charges, which mean the cost of keeping the hospital and furniture in a state requisite for the comfort of the patients, also the salaries of the doctors, nurses, and other employés, and all other expenses for maintaining the hospital.

(3) Patients' expenses, which include conveying, removing, feeding, providing medicines, disinfecting, and all other things required for the patients.

Payment of Expenses.—All expenses incurred by a County Council or by a Hospital Committee under the Act, with the exception of patients' expenses, shall, when a hospital district consists of a single local area, be defrayed out of the local rate of that area. When the hospital district consists of more than one local area, all the expenses, excepting as before mentioned, incurred by the Hospital Committee, shall be paid out of a common fund to which all receipts shall be carried, and to which the Local Authorities in the hospital district shall contribute in such proportions as the County Council by their order constituting the district may determine.

Patients' Expenses—Recovery of.—There is a difference between London and the provinces as regards the administration of infectious disease hospitals. The Public Health Act, 1875, and the Isolation Hospitals Act, 1893, give power to the Local Authorities of the provinces to make a charge, in respect of individual expenses, to non-pauper patients, but neither the Metropolitan Asylums Board nor the several Boards of Guardians have now any such power, Sub-section 2 and 3 of Sec. 80 of the Public Health (London) Act, 1891, throwing the whole of the expenses incurred in the maintenance upon the Metropolitan Common Poor Fund. Then it is no longer necessary to obtain a Poor Law relieving officer's order to qualify for admission into the Metropolitan Asylums Boards hospitals, the certificate of a qualified medical man being sufficient. Under the same Act the pauper character of the relief offered is expressly removed, these hospitals being used freely by all classes.

Notification of Infectious Disease.—In 1899 an Act was passed to extend the Infectious Disease (Notification) Act to districts in which it has not been adopted. This undoubtedly caused an increase in the use of fever hospitals. It extends to and takes effect in every Urban, Rural, and Port Sanitary District, as defined for the purposes of the Act, in England or Wales, whether that Act has or has not been adopted therein before the commencement of this Act. It also provides the following :—

(*a*) That the head of the family, or the nearest relative of the patient resident in the building, must give immediate notice (in case of infectious disease) to the Medical Officer of Health.

(*b*) That the medical practitioner attending the patient, on finding a case of infectious disease, must notify to the Medical Officer of Health for the district the name of the patient, the situation of the house, and the infectious disease from which the patient is suffering.

Isolation Hospitals Act, 1901.—This Act, which is an amendment of the Isolation Hospitals Act, 1893, provides the following :—

(1) Any Local Authority (including a Joint Board) within the meaning of the Public Health Act, 1875, which has provided under that Act, or any local Act, a hospital for the reception of the sick, may, with the sanction of the

Local Government Board, and with the consent of the Council, transfer it to the Council of the county within which the hospital, or any part of the district of the Authority, is situate.

(2) Any money paid to a Local Authority or any such transfer shall be applied as the Local Government Board direct, either in repayment of any loan of the Local Authority, or for any other purpose for which capital money may be properly applied.

(3) Any hospital transferred under this section shall be appropriated to a district formed under the Isolation Hospitals Act, 1893, and may be adapted as an isolation hospital, and any hospital so appropriated shall be treated as if it had been originally established under that Act for the district.

(4) Any expenses incurred by a County Council in or incidental to the transfer of any hospital under this Act shall be defrayed as structural expenses incurred by a Hospital Committee within the meaning of Section 17 of the principal Act.

Cleansing of Persons Act, 1897.—(1) This Act permits Local Authorities to provide cleansing and disinfection for persons infested with vermin. It gives Local Authorities the power, when in their discretion they shall see fit, to permit any person who shall apply to the said Authority, on the ground that he is infested with vermin, to have the use, free of charge, of any apparatus which the Authority possess for cleansing the person and his clothing from vermin. The use of such apparatus shall not be considered to be parochial relief or charitable allowance to the person using the same, or to the parent of such person, and no such person or parent shall by reason thereof be deprived of any right or privilege or be subject to any disqualification or disability.

This Act permits Local Authorities to expend any reasonable sum on buildings, appliances, and attendants that may be required for the execution of this Act, and it provides for any expenses so incurred being defrayed out of any rate or fund applicable by the Authority for general sanitary purposes or for the relief of the poor.

In this Act " Local Authority " means, in England, the Council of any county borough, the District Council of any district, any Board of Guardians, and in the County of London any Sanitary Authority as defined in the Public Health (London) Act, 1891. In the application of this

Act to Scotland, "Local Authority" means and includes any Local Authority under the Public Health (Scotland) Act, 1867, any Acts amending that Act; but the Local Authority shall not erect buildings for the purposes of Section (1) one hereof, except with the sanction of the Local Government Board of Scotland. In the application of this Act to Ireland, "Local Authority" means a Sanitary Authority under the Public Health (Ireland) Acts, 1878 to 1896. Any expenses incurred by a Local Authority in the execution of this Act shall be paid as part of the expenses of such Authority in the execution of the Public Health (Ireland) Acts, 1878 to 1896, and in the case of a Rural Authority shall be general expenses. It also provides that a Local Authority shall not purchase or erect buildings for the purposes of this Act without the consent of the Local Government Board of Ireland.

Public Health Acts Amendment Act, 1907 [7 Edw. 7. Ch. 53].—This amendment of the Public Health Act, which comes into force on January 1, 1908, is cited as the Public Health Acts Amendment Act, 1907. This Act and the Public Health Acts may together be cited as the Public Health Acts, 1875 to 1907. The by-laws made under this Act do not affect the provisions or the construction of hospitals for the prevention of infectious diseases, as provided in the other Acts already quoted.

The principal amendments contained in this Act, are, if the Medical Officer certifies to the Local Authority that any person in the district is suffering from infectious disease which the Medical Officer has reason to suspect is attributable to milk supplied within the district, the Local Authority may require the dairyman supplying the milk to furnish to the Medical Officer a complete list of all farms, dairies, or places from which his supply of milk is derived, or has been derived during the last six weeks. To provide against any person taking or sending to any public wash-house or to any laundry, for the purpose of being washed, any bedding, clothes, or other things which he knows to have been exposed to infection from any infectious disease, unless they have been disinfected by or to the satisfaction of the Local Authority or their Medical Officer, or are sent to a laundry with proper precautions for the purpose of disinfection, with notice that they have been exposed to infection.

Local Authorities may exercise the powers of Sec. 15 of the Infectious Disease (Prevention) Act, 1890, whether that section has or has not been adopted in the district, and, when the Local Authority so determine, those powers may be exercised for providing temporary shelter or house accommodation with any necessary attendants for any person who, in any case to which this section applies, leaves a house after any infectious disease has appeared therein, and the Local Authority may borrow, subject to the provisions of the Public Health Acts, for the purpose of providing shelter or house accommodation under Sec. 15 of the Infectious Disease (Prevention) Act, 1890, or under this section. Sec. 67 of this Act makes provision for Local Authorities to provide nurses for attendance on patients suffering from any infectious disease in their district who, owing to want of accommodation at the hospital, or in cases where removal to the hospital is likely to endanger the patient's health. The Local Authority may charge such reasonable sums for the services of nurses provided by them as they think fit.

Nothing in this section shall be deemed to take away or diminish the necessity of providing proper hospital accommodation for persons suffering from infectious disease.

PROVISION OF SANATORIA BY LOCAL AUTHORITIES.

It is now fully recognized that the advantages of hospitals for infectious and contagious disease are of paramount importance. Unfortunately, in the past, the provision of such buildings has been put off until districts have been invaded with epidemics of a most dread and far-reaching consequence. It cannot be too clearly impressed on all Local Authorities the necessity of providing suitable provisions to safeguard the public. Sir Douglas Galton well says :—" In the case of smallpox and scarlet fever, unless provision for isolation is sufficient to permit of the earliest cases being at once weeded out, the prime object of an infectious hospital is not attained." During the progress of an epidemic, it is of little avail to commence the construction of hospitals. The mischief of allowing infection to spread from the first case, or cases, will already have been done, and the harm cannot be repaired. Then, by carrying out works of extension to existing hospitals the workmen are surrounded with danger. We instance the case of one of the Metropolitan Asylums Board's hospitals for smallpox during the past epidemic of this disease. Many workmen employed in the work of extension contracted the disease by being within the danger zone, and many died.

Hospital accommodation for infectious diseases is required more particularly in towns than it is in rural districts ; still some provision should be made for the most isolated and outlying villages. Where good roads and suitable arrangements for the conveyance of the sick have been provided, the best contingence for small populations is by the provision of a hospital accessible from several villages. Such a building could be planned with accommodation for four or more cases of infectious disease, and be fairly isolated.

For a town the hospital provision should consist of wards in one or more pavilions, with space enough for the erection of other blocks, temporary or permanent. Considerations of ultimate economy make it wise to have permanent buildings sufficient for somewhat more than the average necessities of the situation, so that recourse to temporary additions may not be demanded. In all cases it is advisable to make the administrative offices somewhat in excess of the immediate requirements, and so serve, when occasions arise, the wants of temporary or permanent extensions.

In the case of infectious hospitals the ratio given by Mr. Nelten Radcliffe, as desirable, was about twenty beds for a population of 25,000. In twenty-seven important towns, having a population of nearly 4,500,000, there are twenty infectious beds to each 29,000 persons. At the present time London has about 10,216 beds in the hospitals of the Metropolitan Asylums Board. Some authorities advocate accommodation for infectious cases in the proportion of ten beds per 10,000 of population, with arrangements to admit of three different infections in both sexes. With regard to the number of beds for which an infectious disease hospital should be designed, opinion of experts differ. The large towns necessitate provision of a large number of beds. Whether it is a wise plan to place a large number of acute infectious cases on one site, or divide the number into two institutions, is a debatable point. Mr. T. W. Aldwinckle, a well-known authority on fever hospitals, says :—" I would suggest the erection of two hospitals for 200 beds each, rather than one for 400 beds ; and where the required provision is for 750 beds, three hospitals of 250 beds each might be preferable to two of 375 beds. Indeed, a maximum of 300 beds suggests itself as desirable." The most reasonable course would be to provide an average number of two or three simultaneous infections, and this should be supplanted by temporary arrangements in case of necessity.

HOSPITALS FOR SMALLPOX.

[1] Ever since the issue of the report of the Royal Commission on Smallpox and Fever Hospitals, great difficulty has arisen in the selection of sites for the reception of patients suffering from smallpox. These hospitals have repeatedly served to disseminate that disease to neighbouring communities, and, to use the words of the Royal Commission, " in spite of precautions almost in excess of any that could have been anticipated." There is, however, no evidence to indicate at what distance from populations, whether aggregated in institutions or living in dwelling-houses, smallpox hospitals may be established without risk to persons who are susceptible of the infection. It may be laid down, with a view to lessening the risk of infection, that a Local Authority should not contemplate the erection of such a hospital :—

(*a*) On any site where it would have within a quarter of a mile of it as a centre either a hospital, whether for infectious diseases or not, or a workhouse, or any similar establishment, or a population of 150 to 200 persons.

(*b*) On any site where it would have within half a mile of it as a centre a population of 500–600 persons, whether in one or more institutions or in dwelling-houses.

It should be understood that even when the above conditions are strictly fulfilled, there may be circumstances under which the erection of a smallpox hospital should not be contemplated. Cases in which there is any considerable collection of inhabitants just beyond the half-mile zone should always call for especial consideration.

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[1] Local Government Board Memorandum, 1895.

The general principles of construction may be assumed to be similar under all circumstances. There must, however, be a division between the hospitals coming within the category of so-called fever hospitals. They may be divided into two classes—viz., those of the sanatoria class, pure and simple, and those of the hospital type. In all cases it is necessary that smallpox should be separated from scarlet fever and diphtheria. Hence the class or character of disease to be treated may require a special provision suited to various categories of disease.

Mr. T. Cooker Hurle, M.A. (Cambs.), in a paper read before the Royal Sanitary Institute Congress at Bristol, in 1906, dealing with the provision of isolation hospitals in rural districts, gives the following account of an isolation hospital erected in a rural district in North Somerset. He says :—"A case of smallpox occurred in 1893 in the capital of the district, a county town of 3,000 inhabitants. The Sanitary Authority erected as rapidly as possible an iron block with kitchen and nurses' room, and two wards designed for six patients each, w.c.'s, and bathroom ; a detached iron cottage and a third building (also detached) to house a steam disinfector and ambulance, and to serve (if necessary) as a mortuary. Gas and water had to be laid on from some distance, and sewage disposal was effectually provided by subirrigation, solids as well as slops being thus dealt with. In the first instance six beds for patients were provided, and the total cost up to this point was £732, which included roadmaking and fencing. There was no payment for land, as the field in which it was erected was already the property of the Guardians. Soon afterwards a small iron building for laundry purposes was erected, and from time to time beds were added until the number reached twenty. These brought the cost to about £900, or about £45 per bed."

We are informed that within six months of its erection it was instrumental in stamping out three separate introductions of smallpox, the disease in each instance confined to the first case and cases which had been actually infected from the first case before investigation. Since then this hospital has been instrumental in preventing the spread of several outbreaks of disease, notably in 1896, when scarlet fever patients were removed to the hospital from five different parishes in the district, and in 1901, when forty-six cases of diphtheria were treated.

ISOLATION WARDS IN WORKHOUSES.

When provision is made for isolating cases of infectious disease in workhouses, the wards should be so situated as to preclude the possibility of the spread of infection from them to the other parts of the institution. Then, independent provision for cooking, etc., should also be provided. It is further desirable that, where practicable, the building should contain distinct accommodation for the treatment of at least two different kinds of infection.

The Local Government Board, in their memorandum of requirements and suggestions relating to the provision for infectious disease cases in workhouses, state that "any building intended to contain infected persons or things should be placed at least at a distance of forty feet from the boundary of the workhouse premises, and a like distance should exist between every such building and the boundaries of the hospital site next the rest of the workhouse premises."

The following minimum amount of space per patient should be provided in wards for infectious cases :—

Wall space	12 ft.
Floor space	144 sq. ft.
Cubic area	2,000 cubic ft.

In the design of these buildings it is found that if the above amount of floor area is to be adhered to, then the requisite cubic space can only be obtained by adopting a height of some 14 ft. ; as this height would be somewhat excessive in other than a ward of greater length, or for a larger number of patients than are likely to be provided at a workhouse, it is desirable that a height of say 12 ft. or 13 ft. be adopted, and the floor space be correspondingly increased. The following table gives the required cubic area, and at the same time provides better supervision :—

Wall space per bed	12 ft.
Height of ward	13 ft.
Floor space	156 sq. ft.
Cubic area	2,028 cubic ft.

Provision is necessary for disinfecting linen, clothes, bedding, etc., within a convenient distance from the isolation wards. A detached wash-house and mortuary should also be provided. Some excellent examples of isolation pavilions for workhouses are shown in the memorandum issued by the Local Government Board in 1888, and reissued in 1892 and in 1895, entitled "Provision of Isolation Hospital Accommodation by Local Authorities."

THE PLANNING AND CONSTRUCTION.

The principal object of a hospital is to enable the sick to recover in the shortest possible time; therefore, in order to facilitate the maintenance of healthy conditions the hospital should be such as to ensure the provision and proper application of fresh air, with the necessary warmth and coolness; purification of floors and walls; ample light, with allowance for the penetration of sunshine to every part of the building, and good and efficient means of ventilation to ensure the pure air supplied to the wards being warmed to any required extent, and for the extraction of all vitiated air.

In connexion with the site, it should, where possible, be in the open country, and so maintain a maximum amount of purity of air being breathed by the patients. In the case of smallpox hospitals they should be erected far from our towns, and arrangements made to burn all the air which passes from the wards in which the patients are placed. Smallpox patients may, under ordinary circumstances, be conveyed any distance, and with an efficient and well-arranged ambulance service they can be taken to any distance with a minimum amount of risk.

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THE SITE.

In selecting a site for an infectious disease hospital it is essential, when the conditions admit of it, to test the healthiness of the proposed site. Presuming that the situation is unfettered, except by hygienic requirements, the qualities of a site most favourable to an isolation hospital may be described to be a situation upon a clean, porous, and dry soil, with free circulation of air round it. When the buildings are erected on a site with an adequate area, they are found to involve no appreciable risk to the neighbourhood. In the case of smallpox, however, they should be arranged for at some distance from populous localities.

In some cases, owing to the nature of the subsoil, it is advisable to build the ward pavilions on arches with a space beneath the buildings to allow of a free circulation of air. When this form of construction is adopted, the area beneath the buildings should be concreted and asphalted to prevent the growth of vegetation.

When considering the arrangement of the buildings on the site, it must be borne in mind that in addition to the wards and other buildings, recreation grounds for the nurses, and patients suffering from two or three different diseases, are necessary.

ENTRANCES AND PORTER'S LODGE.

The entrance to a fever hospital should be so situated as to allow of the delivery of stores and for tradesmen to transact their business without coming in contact with the infected parts of the hospital. At the same time it should be conveniently arranged for the admission and discharge of patients. When sanatoria are provided with a small number of beds only, one entrance should suffice for all purposes. In the case of large fever hospitals it is desirable that the porter's lodge should be so situated as to allow of the provision of two entrances, one for the *infected* to enter, and with a carriage drive direct to the hospital buildings, and the other for *non-infected*, with a roadway leading to the administrative buildings, but connected with the before-mentioned carriage drive. With this provision the administration of the hospital may be controlled without any undue risk to those who are transacting business with the institution.

The porter's lodge should comprise an office and waiting-room, sitting-room, kitchen, and the usual out-offices on the ground floor, with at least two bedrooms and a bath-room on the first floor.

RECEIVING AND DISCHARGE BLOCK.

In many of the small sanatoria a receiving ward block is not provided, the patient being examined at the entrance or the certificate of the local practitioner being accepted. In these cases the patient is taken direct to the ward. It is, however, necessary that every patient should, on admittance, be carefully examined as a safeguard against errors of diagnosis on the part of the certifying practitioner. Then it is necessary that a receiving ward should be provided, so that the patients' clothing can be removed and disinfected previous to being placed in the patients' own clothes store.

It is also desirable to arrange a discharge block near the entrance. This building should comprise an undressing room, where the patient is relieved of the hospital clothing and then bathed. Adjoining the undressing-room, and dividing the discharge-room, should be placed a bath-room, so the patient, after bathing, may receive his own clothes and pass into the discharge-room, which is provided to act as a waiting-room for relatives or friends of the patient. In some hospitals two receiving and discharge blocks are provided, one for scarlet fever, the other for diphtheria and enteric fever.

DISINFECTING.

Provision is necessary for disinfecting all clothing of the patients, and bedding, etc., from the wards. This building should be planned with two chambers, as shown on the illustration below. The clothes are received in the infected chamber, and placed in the steam disinfector, which passes the clothing, after being purified, into the disinfected chamber. It is needless to say there should be no communication between the two chambers. The principle of disinfection and the destruction of infection by "high-pressure saturated steam" is well-known, and needs no explanation here. The articles placed in the apparatus are subjected to a high temperature, which ensures the death of all known germs, and the sterilization of spores, without in any way damaging the clothing.

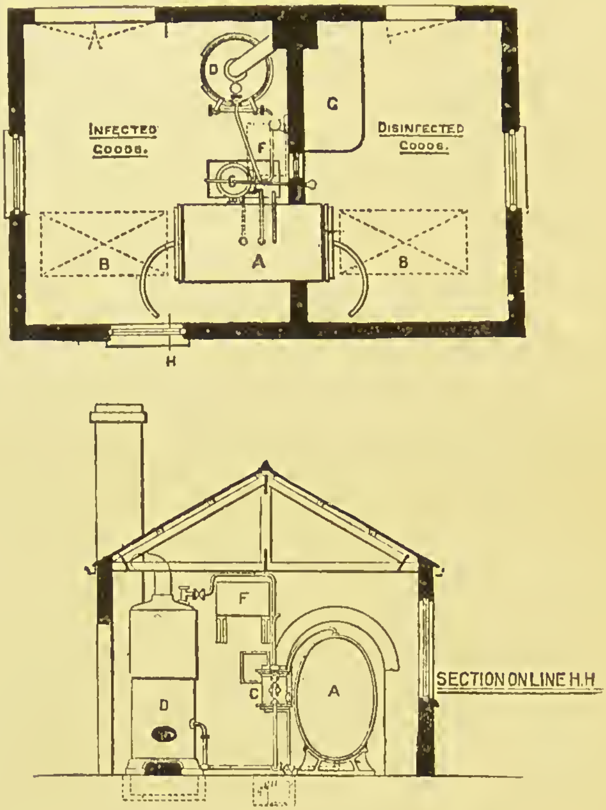


Fig. No. 1.

DESTRUCTION OF REFUSE.

Provision is necessary for the destruction of all refuse, which frequently consists of mattresses and bedding on which patients have been lying, bandages, portions of food, ordinary sweepings, and solid and liquid excrement. The incinerator shown in the accompanying sketch, patented by Messrs. Manlove, Alliott & Co., which is capable of dealing with the refuse produced at either large or small institutions, is now largely used throughout the country. The apparatus consists of a main furnace and drying hearth, with a supplementary furnace. The refuse to be destroyed is placed in the incinerator, either through the top opening or the door in the front. Any gases or solid particles escaping

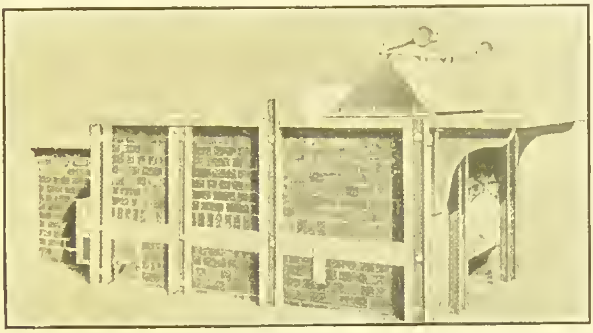


Fig. No. 2.

from the main furnace are cremated by being passed over a supplementary furnace, fired with coal or ordinary fuel.

The illustration (Fig. No. 3) is Messrs. Horsfall's No. 1 Patent Cupola Destructor. This is a type of hospital furnace which has been largely used, particularly in small institutions.

Another destructor largely used is that of Messrs. Meldrum Bros., Ltd., Manchester. This apparatus is made in various sizes and types, having a destroying capacity of from 28 pounds to half a ton per hour.

During the past few years the Metropolitan Asylums Board have adopted this destructor in seven of their large institutions. They have also been fixed in many smaller hospitals throughout the country. The Fig. No. 4 illustrates a small "Meldrum" regenerative refuse destructor erected at the Barnes Urban District Council Isolation Hospital, at Worple Way, Mortlake, Surrey.

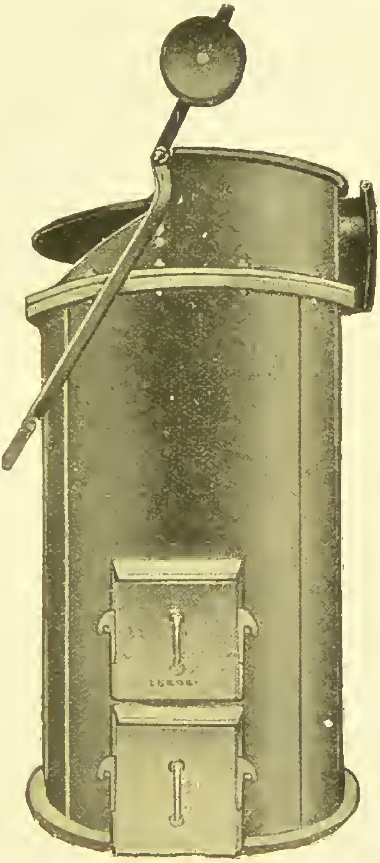


Fig. No. 3.

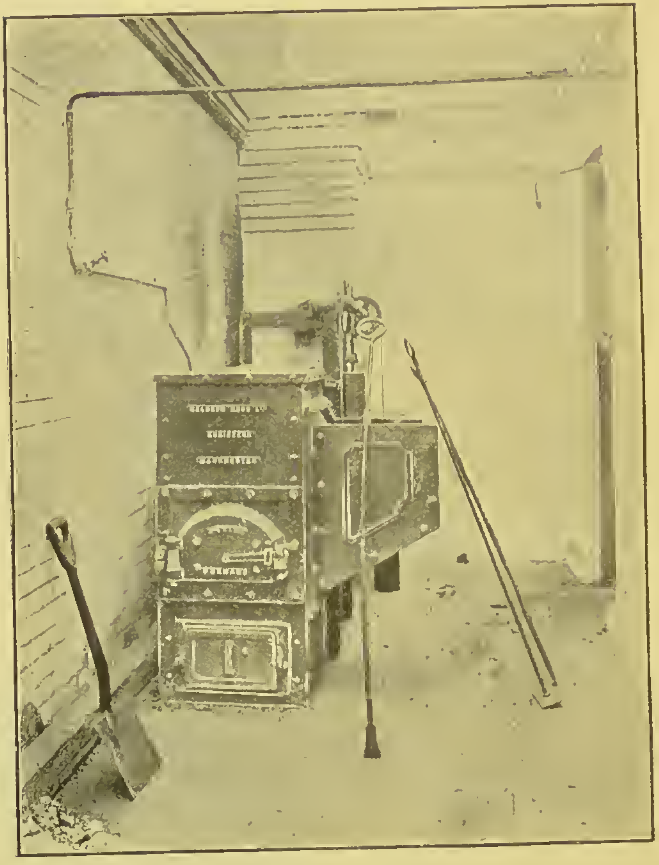


Fig. No. 4.

THE LAUNDRY.

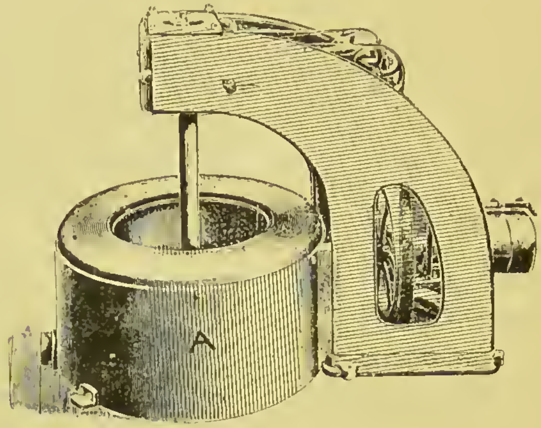
The laundry, one of the most important departments of a fever hospital, should be so situated as to allow of the receiving and despatch of goods without any undue distance being traversed. At the same time, the building should be well removed from the ward pavilions and the administrative buildings. The laundry is generally divided into two departments, one for the staff and the other for the patients' washing. Adjoining the patients' wash-house provision should be made of a foul-washhouse, for receiving and steeping articles soiled by excreta, this apartment being fitted with tanks classified for scarlet fever, enteric fever, diphtheria, and isolated cases. The general wash-house is fitted with steam washing machines, boiling coppers, rinsing tanks, with wringers fixed on the same, hydro-extractors, and soap boilers. The clothes, after being washed and passed through the hydro-extractors, are placed in the drying-horse compartment, or drying chamber. The drying-horse compartment should be situated between the wash-house and the ironing-room.

The ironing-room should be fitted with steam ironing machine, box mangles, and a suitable number of tables for ironing, sorting, and folding articles on. In some cases a delivery-room is provided. In this case the clothes are received from the ironing-room, and, after being sorted, are despatched to the various quarters. It is of the utmost importance that the whole of these buildings should be well ventilated and lighted, and constructed of such materials that will ensure the greatest cleanliness.

It is not our intention to enter fully into a discussion of the merits of the various machines made for and used in the laundry. It is sufficient for the purpose to give a brief outline of the principal machines used in washing and disinfecting the clothing of the hospital.

The Fig. No. 5 illustrates one of Messrs. Watson, Laidlaw & Co.'s self-balancing hydro-extractors (suspended type). With this machine the fast and loose pulleys can be placed on either side, if desired, instead of as shown in the illustration. The basket marked A is made in the following sizes: 24 in., 30 in., and 36 in. diameter. The space occupied by the respective machines is: Length, 6 ft. 3 in., 8 ft., and 8 ft. 3 in., the breadth being 3 ft., 3 ft. 6 in., and 3 ft. 9 in. respectively. The rotary washing machine consists of a circular cage revolving on a horizontal shaft within a strong casing of boiler plate, which is fitted with connexions for water and steam, discharge cocks, safety valves, water circulating and heating nozzles, etc. The motion of the cage is not continuously in one direction, but is reversed automatically with sufficient frequency to prevent roping of the clothes. The automatic reversing arrangement ensures the clothes being thoroughly redistributed in the cage, assisting in effectual and rapid cleansing.

Messrs. Manlove, Alliott & Co.'s rotary washing machine is constructed with an outer casing of mild steel plates mounted on strong cast iron end standards. The door in the casing, which slides upwards, is of polished brass and fitted with a brass handle. The inner revolving cage is constructed entirely of perforated heavy brass plate. The area of the plate immediately surrounding each perforation is so shaped that the interior of the cage presents a surface studded with "rubbing buttons," each with a hole in the centre. These buttons are so formed that the clothes only come in contact with the smooth and rounded surfaces, thus rendering it impossible for any damage to be caused to the articles.



HYDRO-EXTRACTOR.—FIG. No. 5.

Thomas Bradford & Co.'s steam pressure "injector" washing machine is designed principally for fever and other hospitals, where it is essential to obtain perfect disinfection of all kinds of linen. This machine ensures that every part of each article is thoroughly saturated, or permeated with the washing ley or soapsuds; and, in the second place, ensures that the soapsuds are thoroughly worked into the fabric, by the scientific construction of the interior of the machine, in the shortest period of time. The saturation of the linen is accomplished by the injection with the force acquired during the "forward" motion of the rotating compartment of all the soapsuds placed in the outer compartment. The motion of the inner or washing compartment then reverses automatically, and during the "backward" motion all the washing suds that is not absorbed into the linen is ejected back again into the outer compartment. During this alternate forward and backward motion—but more especially during the backward motion—when the fabric contains the least amount of water. As a disinfector this machine is perfectly efficient, and being worked at the normal pressure, it can be attended to by any intelligent person.

Dealing with ironing machines, Messrs. Manlove, Alliott & Co.'s patent safety "Decodum" is devised to safeguard against ignorance or carelessness. With the ordinary type of ironing machine it is possible for the attendant to thrust the whole of his hand into the wedge-shaped space between the feed bar and the revolving cylinder; and if the hand should be thrust into this space with sufficient force, for the purpose of straightening some article which has not been properly arranged, it is possible for the fingers or the hand itself to be caught and injured. The new safety arrangement introduced into this machine make it difficult to reach down to a point at which the fingers could become wedged. Then, by the introduction of a fixed bar above the movable feed bar, articles can be only arranged on it when it has been moved outwards beyond the fixed bar. The movable feed bar must then be moved inwards under the fixed bar in order to bring the articles into contact with the revolving cylinder. The space between the movable and the fixed bar, when the former is in the open and closed positions, is such that it is impossible for the fingers or the hand to be passed between them in such a manner as to be caught and drawn in between the bar and the revolving cylinder.

In equipping a laundry with a drying-closet or drying-room, to obtain the best results, each case will have to be considered on its own merits. The number of drying horses, or the size of the drying-room required, will, of course, be determined by the number of articles that have to be dried within a given time.

Many devices have been tried to effect a rapid and economical drying of clothes, and the problem has received close attention and study. Fire heat is not to be recommended, as it is attended with many dangers. Open-air drying is uncertain owing to our variable climate, and is too slow a system. Experience has taught us that heat radiated from steam under pressure in coils is the best and most economical arrangement for drying and heating the air passing through and around damp clothes, to absorb and carry off the moisture held by them ; as the capacity of air for moisture increases rapidly with increase in temperature.

It is essential that the warm dry air entering the drying-horse compartment, or drying-room, should be diffused evenly throughout the interior, and that merely local currents should be avoided. It is equally important that the air which has passed in and around the wet linen, and which has become charged with particles of water from the clothes treated, should be drawn off immediately to give place to drier air capable of absorbing the moisture in a greater degree, so that a continual and evenly distributed current may be maintained.

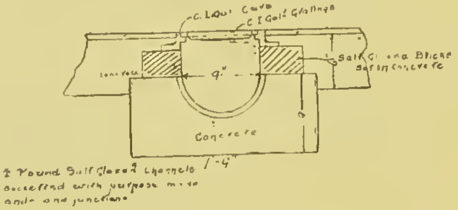

C. I. Curb
C. I. Gal. Gratings
Salt Gl. and Bricks set in Concrete
Concrete
9"
Concrete
1'-4"
½ Round Salt Glazed Channels bedded with purpose made bends and junctions

FIG. No. 6.

To effect the extraction of saturated air the following systems may be made use of : natural or chimney draught, induced draught or forced draught.

The forced draught system of heating, in conjunction with draw-out drying horses, has produced the most perfect results. With this system the clothes are most quickly dried ; then a smaller amount of floor space is occupied than with any other system.

The drying horse compartments are constructed of a range of draw-out horses. One system is running the horses in grooves, or on rails sunk in the floor flush with the surface ; the other system is to carry the horses from above, each being fitted with large wheels at the top, which run on, and are suspended from L-shaped iron bearers, thus leaving the floor space clear.

The horses are made in various widths, 12 in., 15 in., and 18 in., and in length from 5 ft. to 9 ft., to suit the space available. Each horse is fitted with galvanized rails for hanging the linen on, and are strongly framed together. The back and front plates are lined with pine, so constructed that when the horses are drawn out for loading or unloading the aperture in the closet is perfectly closed. The doors are fitted with strong handles made of polished cast brass, and provided with porcelain number plates.

Before passing from the details of the wash-house it should be mentioned that suitable provision is necessary for carrying off the waste water from the floors (see Fig. No. 6). These channels are generally constructed of half-round glazed pipes with trapped gulleys connected to the drains. They are covered with perforated galvanized iron gratings, fixed flush with the surface of the floor, and should be in short lengths so that they may be easily removed for cleansing of the channels.

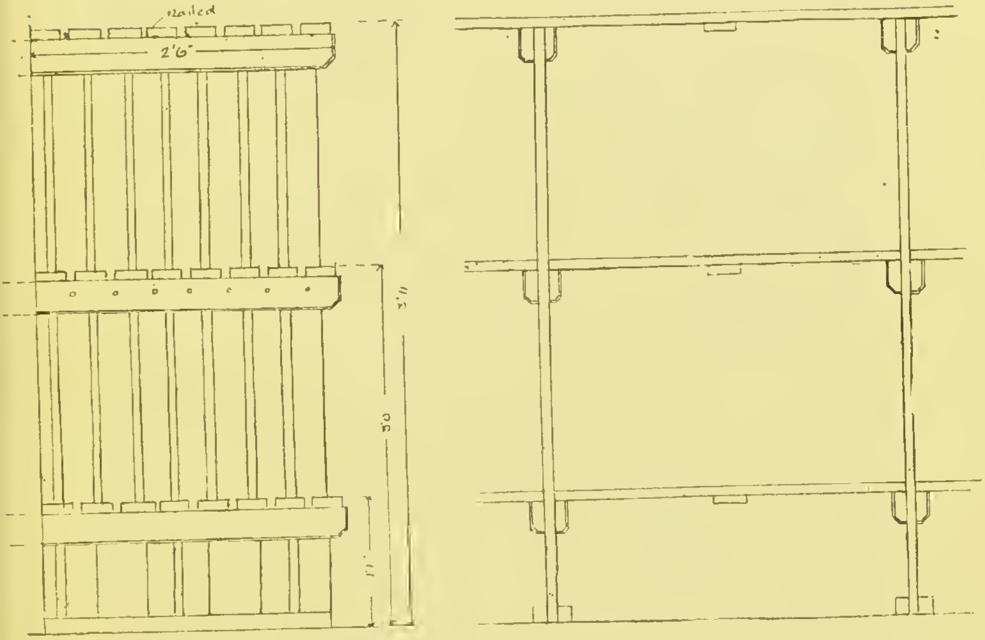


Fig. No. 7.

The receiving and delivery room should be fitted with rack-shelving round the walls, in addition to the necessary tables. The illustration (Fig. No. 7) gives the usual form of shelving adopted.

In conclusion, we should mention that all working portions of machinery should be fitted with galvanized iron guards, to avoid possible accidents to those employed in the laundry.

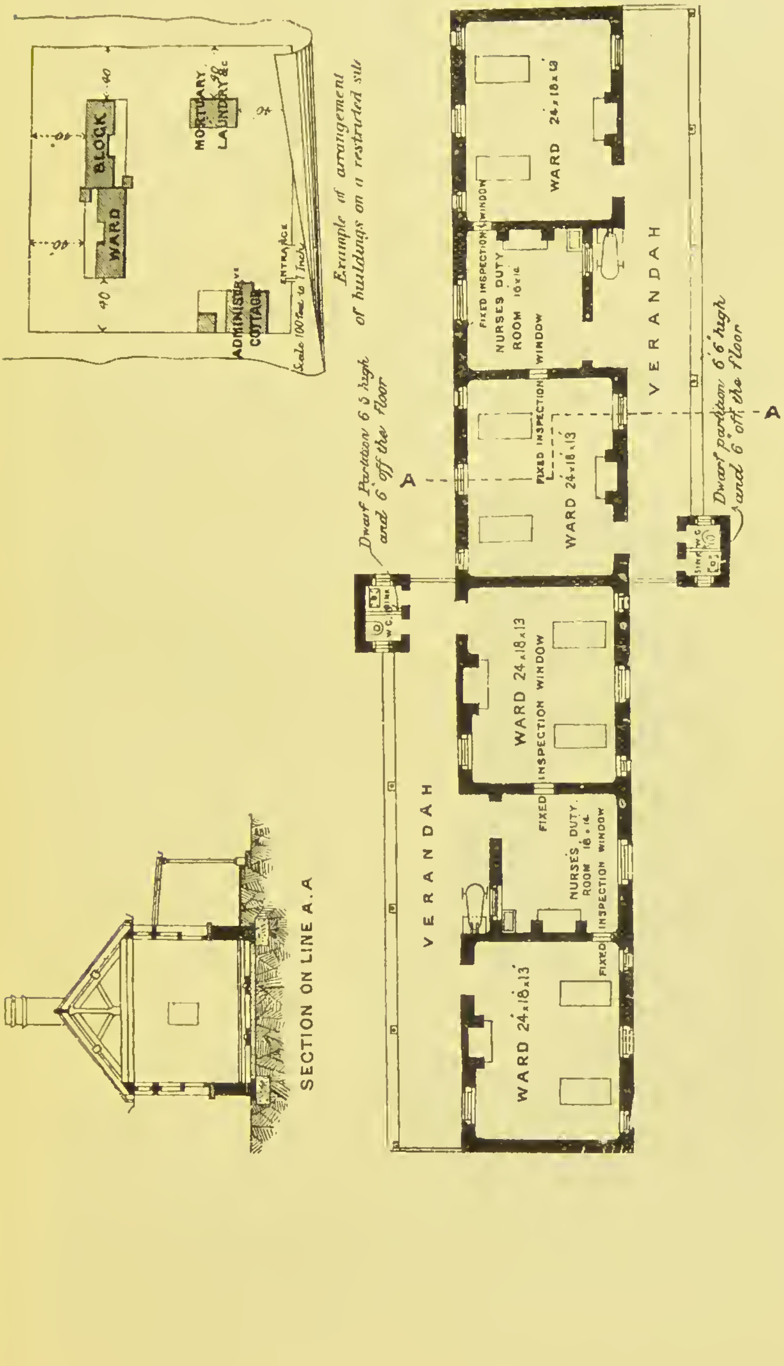
ADMINISTRATIVE BUILDINGS.

The accommodation for medical and nursing staff, stores, cooking, etc., will depend largely on the accommodation provided in the institution. In small sanatoria provision is made for matron's quarters, nurses' sitting and mess-room, medical officer's room, dispensary, mending room, stores and the necessary sleeping accommodation for the staff. In large institutions the medical superintendent is provided with a separate residence. His office is, however, placed in the main administrative building, adjoining the matron's quarters, dispensary and other working apartments.

The kitchen and stores should be placed centrally to allow of easy distribution of food and stores. The matron's department, which comprises linen stores, needle-room and such other apartments, should also be placed centrally in the main administrative building.

The nurses' apartments can be provided in the administrative buildings when the hospital is small. When provision is made for a large number of patients, it is desirable to arrange for this accommodation in a separate block. A nurses' home should comprise mess-rooms, general sitting-room or common room, reading-room, and bedrooms. It is advisable in large hospitals to place the night nurses in separate buildings, so situated as to ensure quietude. The bedrooms should be 13 ft. by 8 ft. 6 in., or 12 ft. by 9 ft. in size. As fire-places are rarely used, excepting for the purpose of ventilation, we suggest that all these rooms be heated with hot-water pipes or radiators, and suitable means of ventilation provided. When the bedrooms are arranged on both sides of a long corridor, it is advisable to place a large window at each end to supply light and air. Provision should also be made in each block of at least one sick-room for use as occasion may require.

When these buildings are erected with two or more storeys, an external staircase should be provided for means of escape in the case of an outbreak of fire. Provision should be made on each floor of water-closets, lavatories, slop sinks and baths.



Example of arrangement of buildings on a restricted site

SECTION ON LINE A.A

Dwarf Partition 6' 6" high and 6" off the floor

Dwarf partition 6' 6" high and 6" off the floor

PLAN OF A BLOCK FOR EIGHT BEDS

FIG. No. 8.

Students' Department.—As it is now fully recognized that the medical student should undertake a course of study in a fever hospital, it is necessary, in the case of large institutions, to make suitable arrangements for the housing of them. It is desirable to provide a well-lighted and ventilated lecture-room, students' sitting and bedrooms; rooms for students' own clothes and for hanging up the overalls which they have worn when visiting the wards. This accommodation should be provided in a building detached from the other blocks.

KITCHEN FITTINGS.

The size of and fittings required in the kitchen of a fever hospital depend principally upon the number of patients and staff for which provision is made. To demonstrate the particular requirements, we give a plan of a kitchen and scullery suitable for an institution with accommodation for 100 persons. The kitchen, which is 21 ft. by 20 ft. in size, is fitted with (*A*) one battery of three wet-steam ovens, for steaming potatoes, puddings and vegetables; (*B*) two 20-gallon steam-jacketed boiling-pans for soups, meat, etc.; (*C*) one 15-gallon tea-making machine, with boiling kettle (not shown, but would be fixed over); one 4-ft. double-oven gas range, with hob-plate for boiling purposes; (*E*) one 5-ft. double-oven kitchener for coals; (*F*) one range of three copper urns, with earthenware linings, for making beef tea, gruel and for milk sterilizing (mounted upon a stand and fitted with copper steam coils); (*G*) one 6-ft. hot-closet and carving-table, with doors both sides.

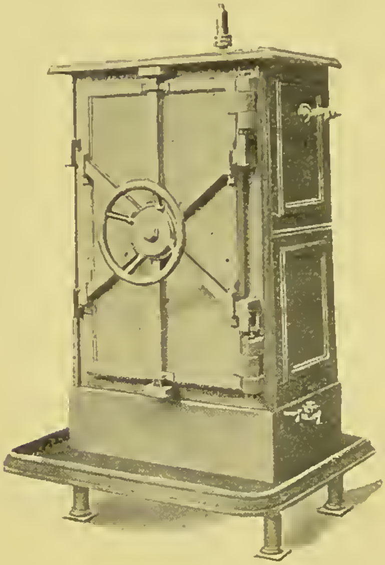


FIG. No. 9.

In addition to the mentioned cooking appliances there should be provided in the centre of the kitchen (*H*) a large table, say about 8 ft. by 3 ft. in size, and one (*I*) about 7 ft. by 2 ft. at the side of the apartment.

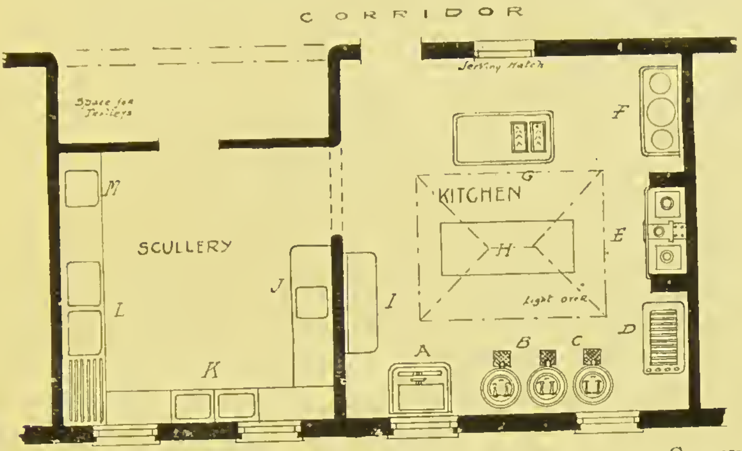


FIG. NO. 10.—PLAN OF KITCHEN AND SCULLERY WITH COOKING APPLIANCES.
McDOWELL, STEVEN & CO., LTD., *Engineers*, LONDON.

The scullery, which is about 17 ft. by 15 ft. in size, should be fitted up with (*K*) one pair of porcelain vegetable sinks with ash draining-boards at each side; (*L*) teak sinks with draining-boards at the left of the same, fitted with standing waste fittings, etc; and a galvanized iron sink for washing pots, with a scouring-board at each side.

The supply of steam for the various fittings is generally obtained from the boilers in the laundry building, the main supply to the kitchen being fitted with a reducing valve.

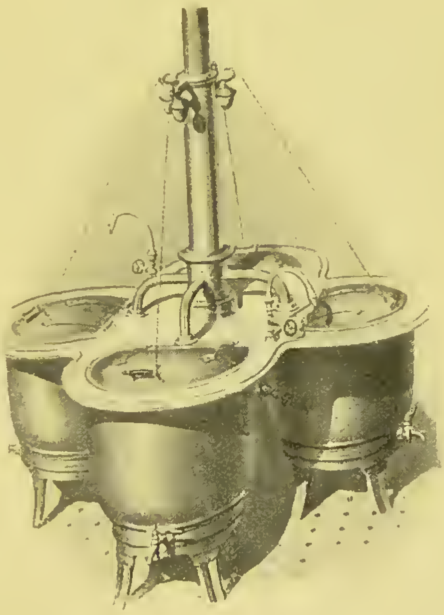


FIG. NO. 11.

The hot-water supply for washing purposes, etc., would be obtained from a calorifier in connexion with the boilers of the laundry, or from the hot-water supply provided for the general administrative buildings.

REMARKS ON WARDS, ETC.

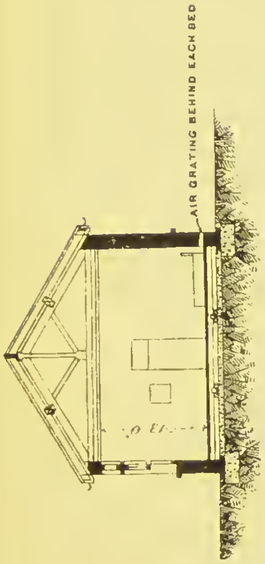
In considering the number of beds apportioned to each disease, the requirements of the locality will have to be considered. As a general rule scarlet fever demands almost a half of the total bed accommodation. As scarlet fever is, in the large majority of cases, an acute disease during the first one or two weeks only, and seeing that it is generally admitted to be most desirable to separate these cases from convalescents, the best arrangement is to have two separate blocks—a small one for acute cases and a large one for convalescents.

The small pavilion should have, in addition to the general wards, a couple of one or two bed wards for the isolation of delirious and noisy cases.

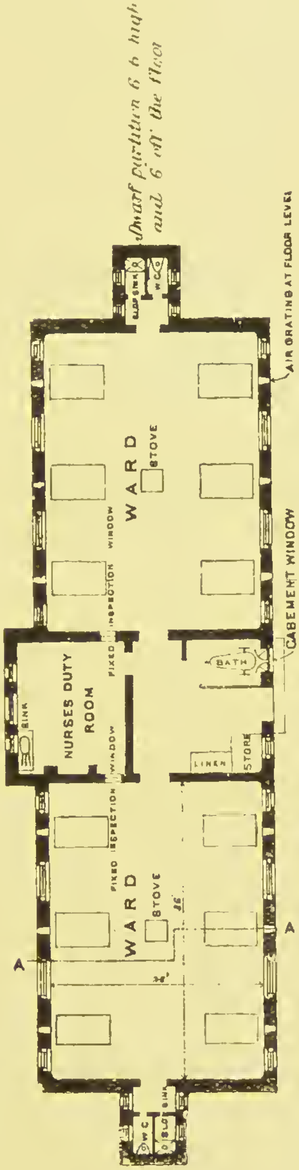
When the convalescent pavilion provides accommodation for twelve to sixteen beds, then one nurse and one probationer can easily manage the necessary treatment and the bathing, etc. (i.e. male and female, 24 to 32), when convalescent; whereas when the cases are divided up and placed in twice the number of smaller separate wards, the nursing staff would be proportionally increased, and the administrative accommodation would be much larger than in the first-mentioned arrangement.

It is advisable to have only as many beds in a ward as is consistent with an efficient nursing unit, as the multiplication of wards both increases the ward adjuncts (which are most costly) and also increases the number of nurses employed. The Metropolitan Asylums Board have fixed the following as a maximum number of beds to a ward: scarlet fever, 20; diphtheria, 12; and enteric fever, 12.

In dealing with the dimension of the wards we find that the Memorandum of the Local Government Board suggests a cubic area of 2,000 ft. for all infectious disease, but we believe that by providing 2,500 cubic ft., in the case of diphtheria and enteric, it will greatly assist the ventilation



SECTION ON LINE A.A.



PLAN OF A WARD PAVILION FOR 12 BEDS

Fig. No. 12.

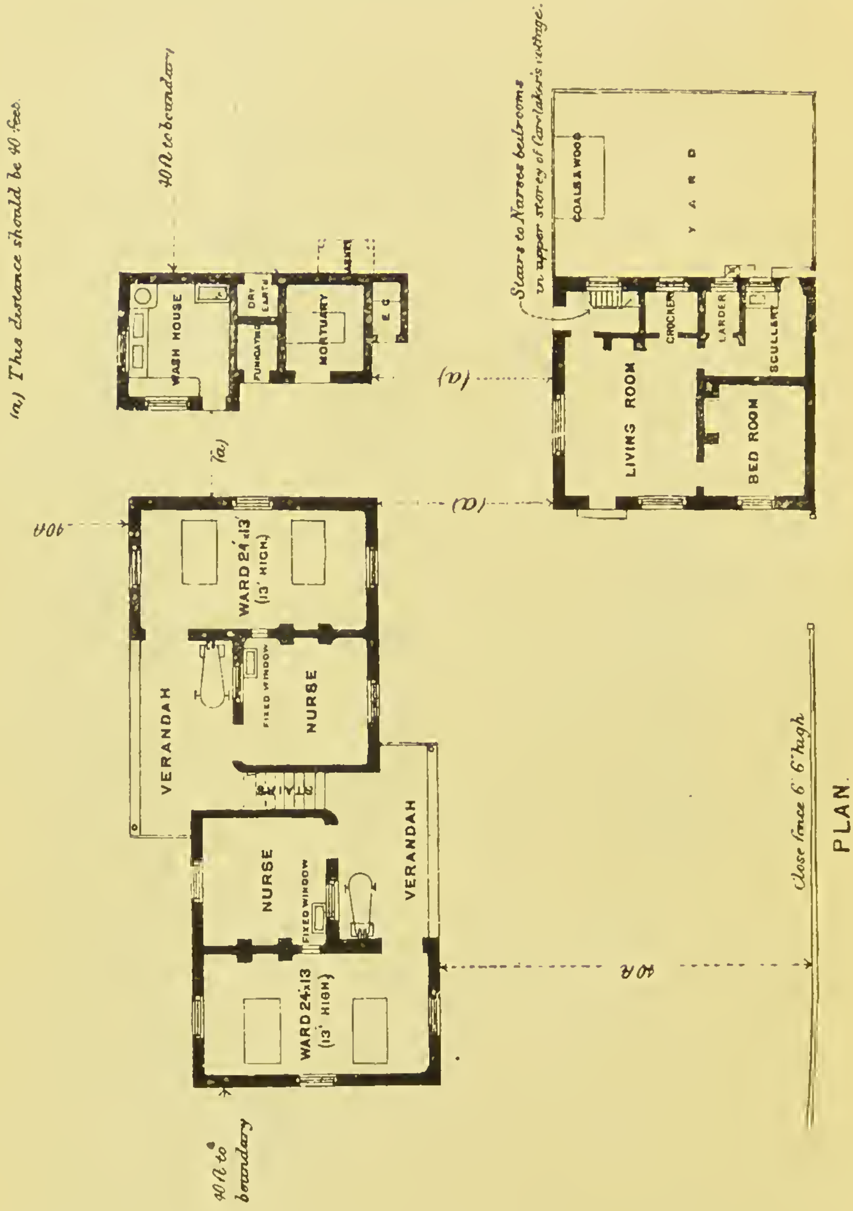

(a) This distance should be 40 feet.
40 ft to boundary
WASH HOUSE
DRY EARTH
FUMIGATING
MORTUARY
E.C.
Stairs to Nurses bedrooms in upper storey of Caretaker's cottage.
COALS & WOOD
YARD
CROCKERY
LARDER
SCULLERY
LIVING ROOM
BED ROOM
(a)
(a)
(a)
40 ft
WARD 24 x 13 (13' HIGH)
NURSE
FIXED WINDOW
VERANDAH
STAIRS
NURSE
FIXED WINDOW
VERANDAH
WARD 24 x 13 (13' HIGH)
40 ft
40 ft to boundary
Close fence 6' 6" high
PLAN.

Fig. No. 13.

and the nursing. The height of the ward would not be increased, the additional area being given to the increased floor space. It is the general practice to make the wards 26 ft. wide, but some authorities advocate an additional width of 2 ft., making the wards 28 ft. wide. This increase is of no small importance, as it admits of greater working space round the centre fireplaces and tables, and also allows of the bed being placed clear of the walls.

A separation ward is required in each pavilion for special cases, and for suspected diseases. It should be provided with separate and distinct water-closet and slop sink. Its fitment and construction should be precisely the same as the other wards. When fireplaces are provided to supplement the heating by hot-water pipes and radiators it is advisable to bear in mind that the air of the ward is greatly affected by the class of grate adopted. It has been found that the "Manchester" grates are more effective in keeping the ward pure than the ordinary grate, and that less fuel is used and a more equal temperature is maintained.

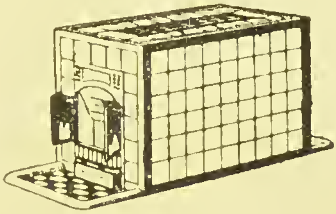


Fig. No. 14.

The Figs. No. 14 and 15 show Messrs. Shorland & Brother's patent "Manchester" stoves. They are made with either ascending or descending smoke flues, and with one fire or two fires, i.e. one at each end. They are largely used in fever hospitals, as they are found to deliver a large volume of pure, warm air, brought direct from the exterior into the building. The down-draught stoves are the more preferable, as they in no way obstruct the view of the ward. When an up-shaft is carried from the stove to the roof it may serve the purpose of ventilating the ward and carrying off the vitiated air, but is, nevertheless, somewhat unsightly.

Isolation Wards.—Wards are generally provided for the isolation of concurrent infectious diseases, such as scarlet fever and diphtheria ; scarlet fever and chicken-pox, measles and diphtheria, and for the separation of diseases which may occur during convalescence ; isolation of single diseases, such as measles and doubtful diagnosis.

In small hospitals one isolation block, similar to that shown by illustration Fig. No. 13, will be sufficient. In larger hospitals, however, it is advisable to divide the wards into two classes; with wards for one bed, and wards for four or more. Each ward should have a duty room, covered verandah for movable bath, larder, linen store, slop-sink, nurses' water-closet, etc., as described for the other wards.

Floors.—The floors of all wards should be constructed of such materials that will be capable of being easily cleaned. In the past the floors have been formed of teak or oak, and then wax polished. That wood floors are far from satisfactory all will agree; they are necessarily full of joints which frequently open and become receptacles for impurities. It has been suggested that a floor covered with terrazzo is the most suitable, but we are more inclined to favour the adoption of such material as the British Doloment flooring.

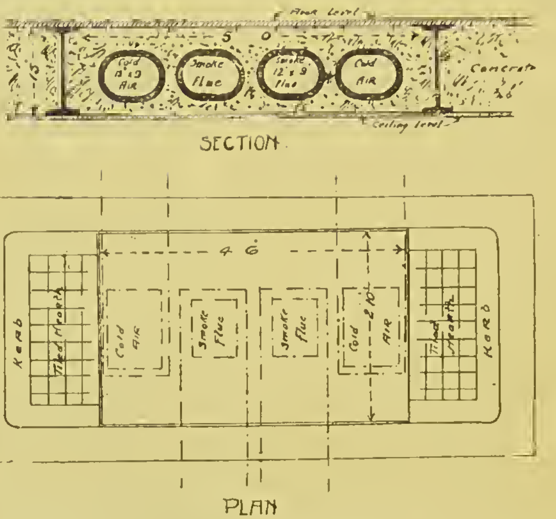


FIG. NO. 15.—DETAIL OF THE "MANCHESTER" PATENT DOWN-DRAUGHT STOVE.

This form of jointless floor, which is used largely in the principal hospitals of Germany, and many hospitals in this country, compares favourably in cost with all other floor coverings in use; then, it is not attended with such objections as coldness, opening joints, or cracking. These floors are laid without a single joint, and can be finished in many colours, and with designs incorporated, which add to the cheerfulness of a ward. What is more, a floor of this material can be finished with a rounded fillet at the intersection of the floor and the wall and carried up the wall to form a dado.

Walls. — The walls and ceiling of all wards should be finished with a hard selenitic plaster or cement face, and should be painted and varnished. The angles made by the walls with each other, and with the ceiling, should be finished with quadrants, the concave surface to the ward. The walls and ceilings should be quite plain, free from all projections, angles, or cornices which accumulate dust.

Windows. — The windows, where the cost will allow of it, should be double glazed to prevent the loss of heat, and to maintain an even temperature in the ward. They should have an area of not less than 1 ft. of glass for every 70 cubic ft. of ward space. A window should be arranged between each pair of beds, and it is advisable to place a window in each corner of the ward, between the end wall and the last

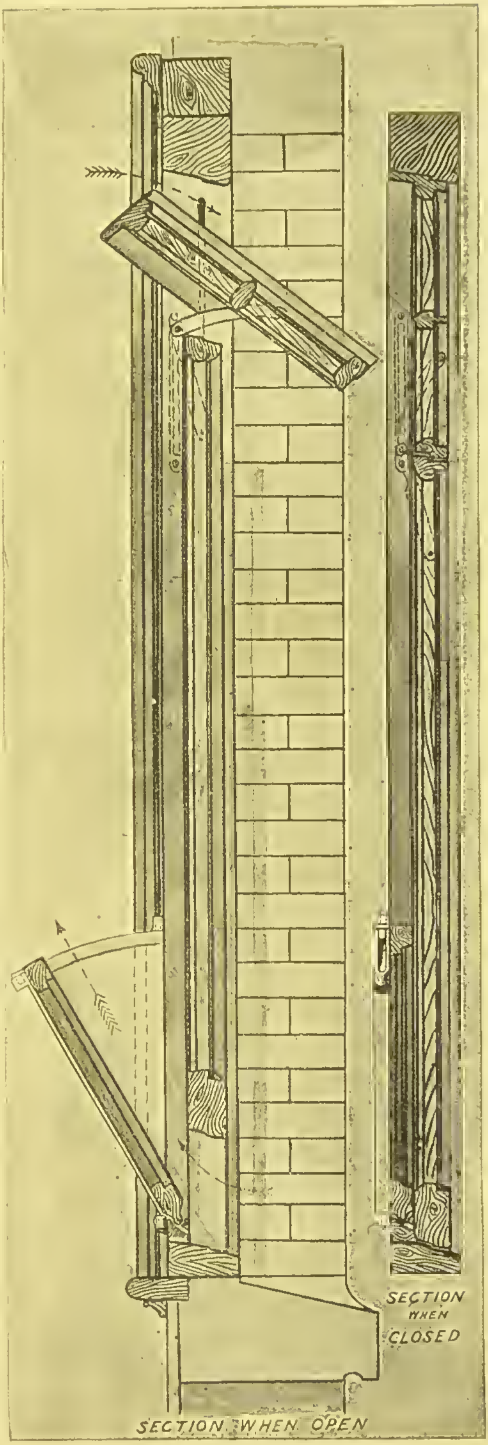


Fig. No. 16.

D

bed. The windows should be divided into two parts, of which the upper part is made to fall in and form a hopper ventilator, glazed hoppers being fixed on each side, the lower portion being formed as double-hung sashes.

The Fig. No. 16 shows the Combination Collapsible Ventilator Company's "C.C." sash. This window, which has been in use for some period in the wards of the Bootle and Linacre Fever Hospitals, is a decided improvement on the old-fashioned double-hung sash, and possesses several unique features, making it applicable for use in infectious disease hospital wards. It is formed with a single sash at the bottom, which, when being raised, automatically opens the upper light. At the bottom of each window, at the sill level, a ventilating hopper is fixed. When the lower sash is opened the air strikes the inside of this screen and is forced upward into the ward, thus admitting a great amount of fresh air without creating any draught; in fact, a person can stand close up to the screen without feeling any draught from the open window. The glazed hoppers and screen are screwed on to the face of the sash frame, and the whole of the parts are so connected that the act of closing the front screen automatically closes also the hinged sides, thus leaving the hopper practically flush with the window frame. The screen may easily be taken out for cleansing purposes and replaced.

Doors.—The doors in the wards should be so arranged as to facilitate nursing, and be large enough to allow the passage through of the sick on movable stretchers. Double-hung doors are not convenient or advisable, as the opening of the whole door is troublesome. Single doors should afford an opening of from 3 ft. 8 in. to 4 ft., which allows of the passage of stretchers, trays on wheels, and movable baths, etc.

The construction of all doors in wards should be such as to present as few projections, or places for the accumulation of dust, as possible. The upper part of entrance doors to wards should be glazed.

The "Gilmour" doors, which are constructed on hygienic principles, are recommended for all wards where an absolutely smooth surface is essential. They have the appearance of a solid plank, so made as to leave no lodgment for the secretion of dust or foreign matter. They fulfil all the requirements from a hygienic or sanitary point of view, and at the same time are in no way unsightly.

Ward Adjuncts.—The adjuncts for water-closets, slop and scalding sinks should be separated from the ward by intervening lobbies, and having windows at each side. These lobbies should be large enough for convenient access and to admit of ward refuse being placed there. It is advisable to fix in each of these lobbies a radiator capable of raising the temperature to a higher degree than that of the ward so the air is drawn from the ward into the lobby instead of vice versa.

The water-closets should never be placed against an inner wall, but always against the outer walls of the compartment. The sinks for slops, bed-pans, etc., should have a separate compartment adjoining the water-closets. The partitions dividing the same should be constructed to stand about 3 in. above the floor.

The baths and lavatories are generally placed in one room and should lead direct from the ward, without an intervening lobby. The bath-room should be lined throughout with white glazed bricks or "Opalite" tiling, the floor covered with Terrazzo, or similar paving.

We will now consider briefly the various sanitary fittings and the general treatment of such appliances necessary in the equipment of an infectious disease hospital. It should be mentioned that all such fittings should be fixed against an external wall, and so placed that the wastes may be easily overhauled, and if necessary, altered or repaired. The water-closets and bed-pan sinks being the most important of sanitary fittings in use, they call for special attention. We do not propose to deal with the many forms and construction of water-closets that are in use; it is sufficient for our purpose to look to that pattern or design that is the most applicable, and which meets with the general approval of sanitarians. The wash-out closet should not be adopted, as it is condemned by all who are capable of passing an opinion on the subject. This form of closet is so constructed that the water at the bottom of the basin, being shallow, allows the excreta to be forced to the back of the basin or outgo, instead of passing straight down the trap. The best form of closet in use is that known as the wash-down. It is made of a pedestal or Corbel form and is fitted with a lift-up seat hinged so as to fall against the wall. When considering the sanitary fittings required for use in fever hospitals, we visited many works to obtain a selection of those fittings which appeared most applicable. In the showrooms of Messrs. Davis, Bennett & Co., of the Westminster Sanitary Works, Horseferry Road, London, S.W., we found every description of water-closets working to perfection. Their "Corbel" closet is an excellent example. It is fixed on iron brackets, or with lugs built into the wall, clear of the floor. On the floor under the closet is fixed a porcelain safe with a skirting at the back. This safe is constructed with a waste outlet and trap, so that any water overflowing is carried away and the floor is kept perfectly dry. The cistern and flushing pipe are of porcelain enamelled iron, so that there is no possibility of dirt or dust lodging on the same. The whole of these fittings being plain and having no mouldings or projections, allow of perfect cleanliness being maintained.

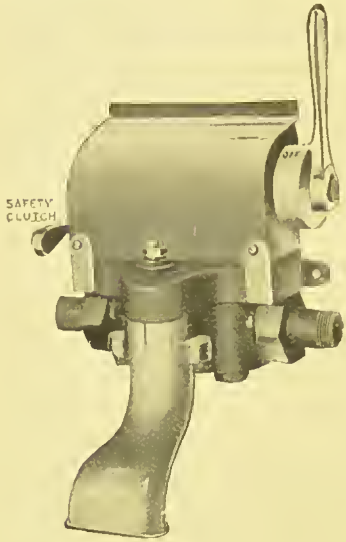
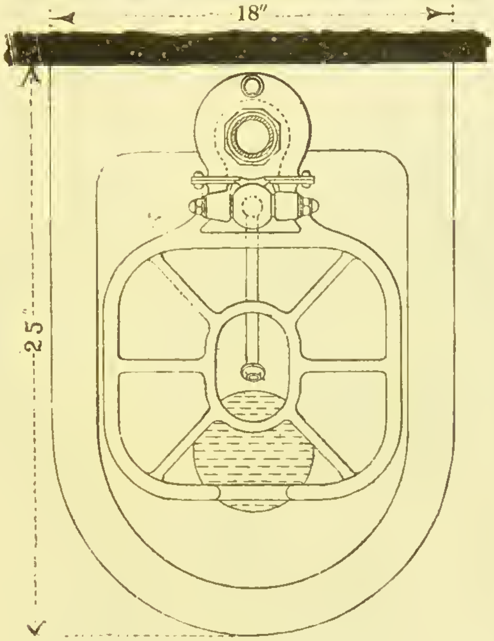


Fig. No. 17.

When considering the baths and their fittings it should be borne in mind that the valves for supplying the water should be of such a design that will safeguard the patient against scalding or other accidents. The illustration, No. 17, shows a special mixing-box fitting, specially designed for this class of building. With this fitting it is impossible to overheat the water. When the lever is turned on it supplies, in the first place, cold water only. The attendant can then press the lever further and obtain tepid water, and further still hot. It will thus be seen that a patient is safeguarded against the risks of scalding.

The Figs. Nos. 18 and 19 show Messrs. Shanks & Co.'s "Victorian" patent slop-sink and bed-pan washer. The sink itself is made in one solid piece of white enamelled fire-clay, with trap and flushing rim. The special feature of this apparatus is the arrangement for the washing of the bed-pans. There is provided a jet for washing purposes, and a grid for supporting the pans. It is so constructed that it will take any shape or size of pan in use, and it is as convenient for the cleansing of narrow-necked urine bottles as it is for an ordinary open pan. The grating, for support, is made of brass, and is covered with vulcanite, which, besides being smooth and perfectly impervious, is softer than metal, and so calculated to prevent the risk of breakage. This grating is worked on a swivel at point A, as shown in the Fig. No. 19, and when the sink is to be used as an ordinary slop-sink the grating may be lifted up, out of the way, and held by a catch fixed for that purpose.

The hot and cold supplies to the bed-pan washer and draw-off nozzle are obtained through a patent mixing-plate, as shown. The draw-off nozzle is hinged, so that it may be lifted out of the way. This fitting, which is as complete and perfect in detail as it can be made, has been adopted in many important hospitals.



PLAN.

Fig. No. 18.

In the disconnecting lobby between the wards and water-closet and slop-sink two openings should be formed in the external walls. One for the reception of soiled linen (which can be drawn through by the porter on to a trolley outside), and a smaller opening in which any stools can be kept for inspection. It is necessary to fix a tightly-fitting internal iron door to each of these openings. Messrs. Davis, Bennett & Co. supply a small cupboard fitting which is specially designed for the reception of stools and other articles (Fig. No. 20). It is constructed of white porcelain, and fitted with teak doors and frames. They contain shelves sufficiently large to receive any number of utensils from one ward.

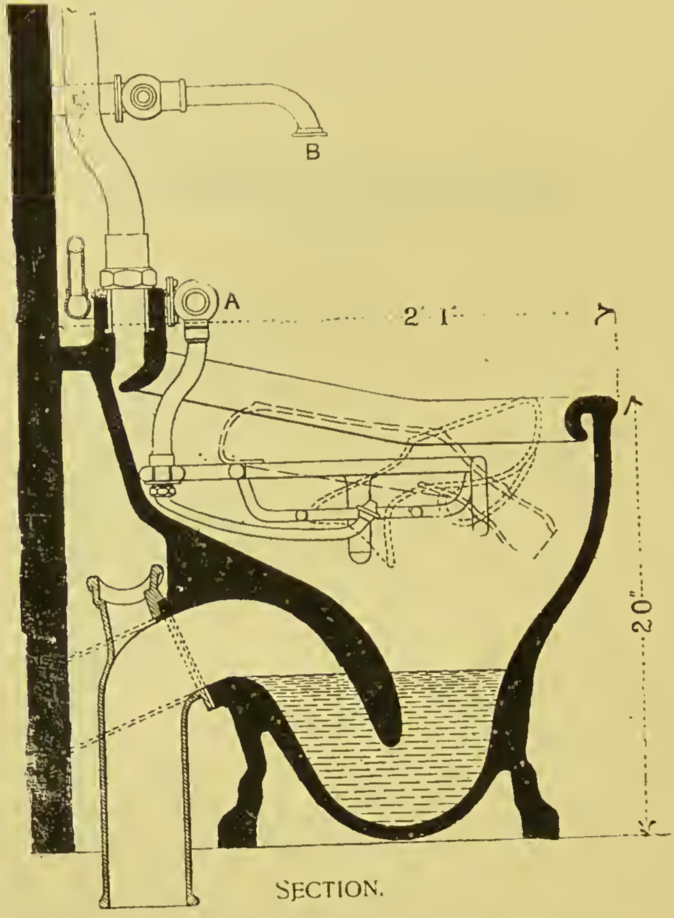


Fig. No. 19.

The best form of water waste preventing cistern is that with a syphon action. A slight pull of the chain will put the syphon in action, when the whole contents of the cistern are discharged through the flushing pipe into the closet. No more water can then escape until the cistern is refilled and the chain once more pulled. All soil-pipes fixed to receive the contents of water-closets and slop-sinks, which are above the ground level, should be circular in section, and 3½ in. to 4 in. in diameter. They should be of drawn, milled, or rolled lead, 8 lb. per foot; and should be fixed outside the building, and have wiped soldered joints between each length of pipe, each pipe being 10 ft. in length. When cast-iron soil-pipes are used they should be galvanized outside, and coated internally with hot coal-tar pitch, or with Dr. Angus Smith's solution. The joints between the different lengths should be caulked with oakum, and then run with blue lead. The joints between the iron pipe and lead T-piece from the closet should be made with a brass ferrule, caulked in with lead; the lead pipe attached to the brass ferrule by a wiped joint. Lead pipes used for discharging hot water through, from slop-sinks and other similar fittings, are liable to expansion, therefore iron should generally be used. All soil-pipes should be fixed clear of the walls and secured to cast-iron holder-bats built in the walls. They should be of such a design that the soil-pipes may be easily removed in case of necessary alterations or repairs.

Fig. No. 20.

When one soil-pipe receives the discharges of several water-closets on different floors, the passage of the contents of one of the upper closets down the soil-pipe may cause the water in the trap of the lower closet to be drawn off, owing to the force of the downward current of air caused by the descent of the liquid. To prevent this syphonage taking place a 2-in. lead anti-syphonage pipe should be carried up from every branch soil-pipe a few inches beyond the trap (on the soil-pipe side), and should join with one another on their way up outside the building, the common pipe being carried up separately or connected with the ventilation of the soil-pipe.

Duty Room, etc.—The duty room, sometimes termed ward kitchen or scullery, should lead direct from the corridor. It should be so situated as to overlook both the principal and the separation wards, and contain a gas cooking stove, dresser, washing and rinsing sink, and a small cupboard. Provision of a water-closet, a lavatory, and a robing-room in connexion with each pavilion is necessary for the use of the nursing staff.

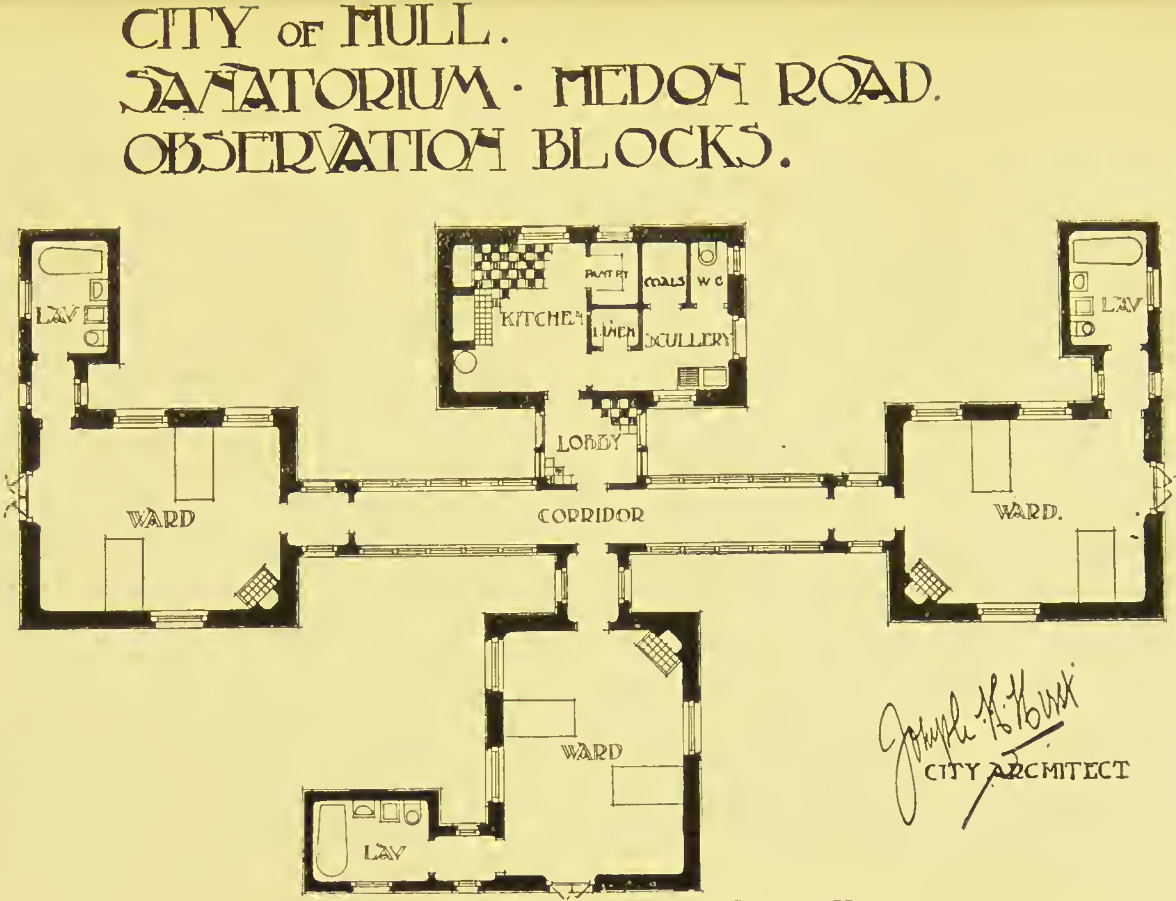
Inspection Window between Wards and Duty Rooms.—When inspection windows are provided between the nurses' duty room and the wards, they should be built out in an angular form so as to project into the ward, thus enabling the nurse on duty to see every bed with ease. Dr. Meredith Young, M.D., speaking on the construction of Isolation Hospitals, said : "Inspection windows have always appeared to me to be almost, though not quite, a superfluity, for in the majority of those hospitals which I have visited they were either covered with curtains, or the window-sill was so filled with plants, etc., that they were almost useless for their purpose." It is, therefore, desirable that these windows should be built up from the floor and have no sills, so that the nurses have no opportunity of placing plants or other articles in front of the windows.

That these inspection windows are not strictly required is proved by the treatment of diseases in the new pavilions at the City of Hull Infectious Disease Hospital.

When we inspected these pavilions, which are a distinct departure from the usual plan, we were informed by the Medical Superintendent and the Medical Officer of Heath for the City that the supervision of these wards was efficient and satisfactory in every way.

In this case the ward kitchen is placed quite apart from the wards, and has no windows overlooking them. There are many advantages in a building of this character ; it is possible to entirely isolate three distinct diseases and to serve the same from one administrative centre.

Mortuary.—This building is generally placed near the entrance and provided with means of isolating bodies for the purpose of viewing and identification. The mortuary should comprise a room fitted with slabs for the reception of dead bodies, visitors' waiting-room, and viewing closet. The post-mortem room should adjoin the mortuary and have a north light. This room should be well lighted and



Plan of Isolation Pavilion, City of Hull.

ventilated. It is furnished with sinks, lavatory, anatomical table, and glass shelves for the reception of bottles.

The whole of the walls inside this building should be faced with glazed bricks, or "opalite" tiling, and the floor covered with terrazzo or similar paving.

Fire Protection.—The provision of suitable fire appliances is necessary to protect the buildings against fire, and the most ready means should always be at hand with which to attack a fire at its outbreak. It is desirable, where the water company's mains are to be relied on for a constant and sufficient pressure, to provide a firemain inside the building with a number of hydrants, each fitted with hose, branch pipe, etc. As an extra precaution a number of fire-buckets should be provided in every building.

When no main water supply is available, a tank is generally placed at the highest position in the roof of one of the buildings, or in a detached block constructed for the purpose and used for fire-extinguishing purposes only.

Telephonic Installation.—A system of electric intercommunication is necessary between every part of an institution, either by means of telephones or bells. It is desirable that the medical superintendent's office should be connected by telephone with the steward's and matron's office, the porter's lodge, the receiving block, and the nurses home. Telephonic communication should also be provided between each of the ward pavilions and the administrative building for cases of emergency. A bell-call should be provided from the medical superintendent's and the matron's office to the porter's lodge and to the nurses' home; also from the steward's office to the stores, engineer's quarters, laundry and porter's lodge, the code of signal in reference to the supply of steam, outbreak of fire, or other call, being previously arranged.

TEMPORARY HOSPITALS.

The earlier practice of erecting temporary isolation hospitals of such materials as wood and corrugated iron is now being superseded by concrete and terra-cotta structures; of the latter type perhaps those built by the Permanent Building Construction Syndicate and the "Frazzi" Construction Company are the best examples of what can be achieved at a comparatively small expense.

The Permanent Building and Construction Syndicate.—This patent construction, which has only recently been brought before the public, is such as to commend itself to all who contemplate the speedy erection of small hospitals. Buildings erected of this form of construction are absolutely fireproof; the walls, partitions, roofs, ceilings, and, in fact, the whole building being entirely non-combustible. A hollow space is maintained throughout, between the exterior and the interior face of the walls; they are, therefore, both sound and damp-proof.

The cost is relatively one-half that of wood and iron, and less than one-half that of brick and mortar.

The "Frazzi" Construction.—The Sanatorium at Benenden, Kent, for the treatment of tuberculosis, which was erected entirely on this system, has given every satisfaction. This building was erected with steel frames filled in with hollow terra-cotta blocks; the whole of the constructional steel work being encased with terra-cotta blocks, which, projecting on the exterior face of the building in the form of pilasters, relieve the front of the building and architecturally improve the structure (see Fig. No. 21).

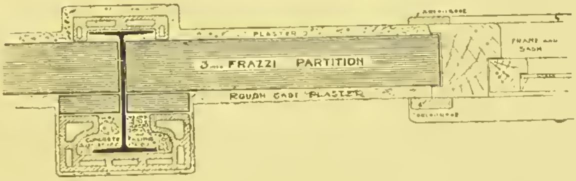


Fig. No. 21.

The floors, which have a 12-ft. span, are constructed with terra-cotta blocks placed at 3 ft. 4 in. centres, resting upon 6 in. by 3 in. steel joists. The stanchions are 7 in. by 4 in., and the main girders are 9 in. by 4 in. The internal walls are formed with "Frazzi" partition blocks plastered both sides. The external terra-cotta walls are finished with rough cast plaster work.

"Speirs" Patent Construction.—Another form of temporary construction, now taking the place of the older form of corrugated iron buildings, is that of "Spiers" patented system of composite iron and wood construction. The walls and partitions internally are covered with cartridge board covering which, when painted with their fireproof compositive, presents an impervious, smooth, and sanitary surface, without joints or crevices.

The Border Combination Smallpox Hospital at Boghouse, near Earlston, was constructed on "Spiers" composite type. The accommodation here consists of two wards of eight beds in all, in one pavilion, with a central nurses' duty room. Nurses' quarters are provided in a separate block of the "Speirs" construction.

The new hospital erected as an addition to the existing fever hospital at Leanchoil was also erected by Messrs. Speirs.

THE METROPOLITAN ASYLUMS BOARD.

In 1867 the Metropolitan Poor Act brought the Asylums Board into existence, and this body set to work to provide infectious disease hospitals, nominally for paupers only. They have been largely used by non-paupers, but are now free to all, no disability attaching to the use of them. It should be stated that the Managers of the Board have carried out their work admirably, and have created for London an unequalled hospital service.

The institutions administered by the Board are fifty-one in number, amongst them being sixteen hospitals for infectious diseases, three seaside homes for children, a land ambulance service (eight stations), and a river ambulance service (three wharves and five steamers). The Board's properties comprise an area of about 1,500 acres.

It is contended that provision for isolation of infectious disease should be made at the rate of not less than one bed for each thousand of the population. The subject, as regards the metropolis, was dealt with by the Royal Commission in 1881–2, who, in their report (1882), recommended that the provision of hospitals should be extended so as to provide 5,100 beds, viz., 3,000 nominally for fever, and 2,100 for smallpox. Diphtheria cases were not at that time admissible to the hospitals. The population of London in 1882 was a little over 3,860,000; consequently the Commissioners' recommendation went to the extent of 1,240 beds (at the least) beyond the theoretical requirements of the day. But they desired that provision should be made for probable requirements for a lengthened period in advance; and the amount of accommodation advised is even now in excess of the standard, the estimated population being under 4,700,000. Circumstances, however, not then anticipated, have led to increased demands on the resources of the Asylums Board, not only by the Sanitary Authorities, but also by private medical practitioners and others.

Among these circumstances may be mentioned the following:—

(*a*) Depauperization of medical relief in the hospitals, and the opening of the several institutions to all classes of people.

(*b*) Admission of patients, on whatever form of application, subject only to the production of a medical certificate.

(*c*) Gratuitous treatment, the popularity of the hospitals themselves, and the increasing recognition by the public of the advantages accruing from the isolation of the infectious sick.

Compulsory notification has been very effective, for now that the sanitary authorities become acquainted with practically all cases of infectious disease, they are able to secure the admittance to the hospital numbers of cases of which in pre-notification days they would probably never have heard.

The following is a return of the Metropolitan Asylums Board's hospital accommodation:—

For Fever and Diphtheria and Acute Cases.

	Beds.
Eastern Hospital	368
North-Eastern Hospital	678
North-Western Hospital	460
Western Hospital	452
South-Western Hospital	345
Fountain Hospital	402
Grove Hospital	518
South-Eastern Hospital	488
Park Hospital	548
Brook Hospital	568
Total	4,827

For Fever and Diphtheria Convalescent Cases.

Northern Hospital (at Winchmore Hill)	738
Gore Farm, Upper Hospital (near Dartford)	961
Gore Farm, Lower Hospital	850
Southern Hospital (at Carshalton) about	800
Total	3,349

For Smallpox Patients.

	Beds.
Longreach Hospital	300
Orchard Hospital	800
Joyce Green Hospital	940
Total	2,040

Dealing with the question of mistaken diagnosis, it was found that, of the cases admitted to the fever hospitals in 1906, 8·3 per cent. were, after admission, found not to be suffering from the diseases mentioned in the medical certificate upon which they were removed to the hospital. Scarlet fever was erroneously certified in 932 cases, diphtheria in 959, enteric fever in 235. The average detention of these cases was 21·5 days. It is suggested by one of the medical superintendents that "there is a growing disposition on the part of practitioners to get cases away while they are still in a doubtful stage." On this the Statistical Committee of the Board observe, that if it be so, "and it becomes a recognized practice for the Board's Medical Officers to admit *suspected* cases of infectious disease, it will have a most important bearing on the question of the amount of isolation accommodation to be provided, and more especially in connexion with smallpox hospitals." Provision is now made for dealing with doubtful or suspected cases at the South-Western Hospital, Stockwell, and the South-Eastern Hospital, New Cross.

ISOLATION CUBICLES.

[1] The Board have now made arrangements for the isolation of patients suffering from, or suspected to be suffering from, scarlet fever, diphtheria, or some other disease. The Board have had two of their hospitals converted into cubicle wards to supplement the existing isolation accommodation, i.e. the South-Western Hospital, Stockwell, and the South-Eastern Hospital, New Cross.

The cubicles at the South-Western Hospital are arranged on each of two existing wards, having a corridor in the centre. The ward is 100 ft. long, 28 ft. wide, and 14 ft. 6 in. high; each ward originally contained eighteen beds. Provision is now made for sixteen cubicles, each having 120 ft. floor area.

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[1] See Children's Isolation Cubicles, Infectious Disease Hospital, Paris.

The cubicles are divided from each other by partitions 7 ft. high above the floor, formed of 2 in. steel framing, the lower portion filled in with asbestos panels, the upper portion glazed with 32 oz. sheet glass. The partitions stand a few inches clear of the floor, and are fixed on hard wood fillets, rounded on both edges. The doors are 3 ft. 2 in. wide, and so placed that the door of one cubicle is not opposite that of another. A large window, formed with double-hung sashes, and hopper sash over, is fixed in each cubicle.

Every cubicle is furnished with a fixed basin, the waste pipe from which is carried through the wall, and over it is fixed a tepid spray worked by a pedal action. Separate overalls are hung in each of the cubicles, which are worn by the medical and nursing staff when attending to that particular patient, while a sterilized towel, hung in proximity to the spray, affords convenient opportunity for ablution of the hands immediately before leaving the cubicle.

A bath-room is attached to each of the wards, and furnished with a portable enamelled iron bath, which can easily be run into the cubicles, while a gas-heated copper sterilizer, furnished with a hot-water supply and a controllable waste, provides facilities for sterilizing every article which has been used for the patient's treatment. In the scullery attached to the ward is a second sterilizer, of large size, for the disinfection of the plates, mugs, knives, forks, and spoons, etc., after they have been removed from the cubicles. It is believed that for certain cases sufficient protection is furnished by the relative isolation afforded by cubicles, *provided scrupulous care* is exercised by the attendants, both medical and nursing, who are entrusted with their administration. The principle underlying the system is, of course, "aseptic" in its conception.

For the present the cubicles will be exclusively utilized for the temporary isolation of doubtful or anomalous cases, and for certain recognized attacks which are believed to be unattended with a high degree of infectivity.

The cubicles at the South-Eastern Hospital are, generally speaking, similar to those at the South-Western Hospital. Here they have a floor area of 141 ft. Each ward, which as a general ward contained twenty-four beds, will have twenty cubicles, or with a loss of four beds (16 per cent.). It is estimated that the cost of this form of isolation is about £30 per cubicle.

GROVE FEVER HOSPITAL, TOOTING, LONDON, S.W.

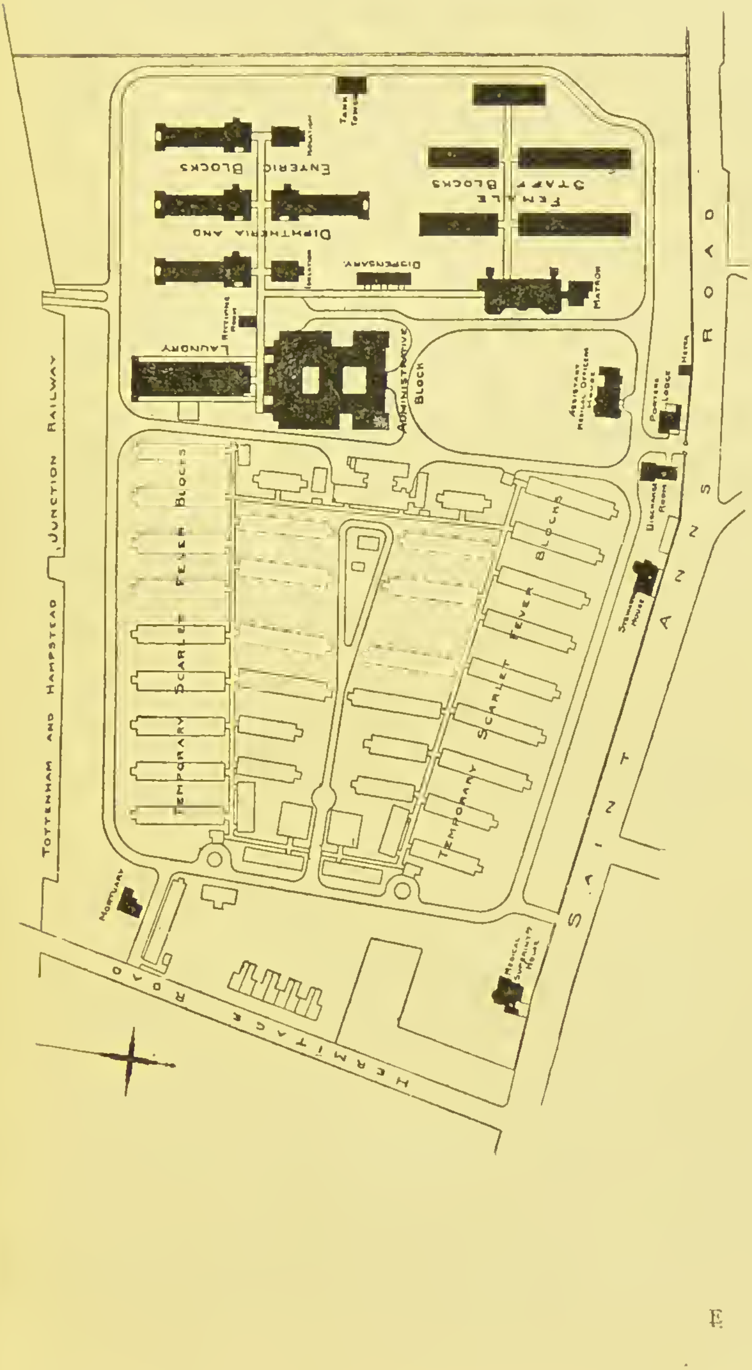
The Grove Fever Hospital, Tooting, which was erected by the Metropolitan Asylums Board in 1897, cost about a quarter of a million. It occupies a site of 27 acres, and was erected from plans designed by Mr. A. Hessell Tiltman, F.R.I.B.A. This hospital is capable of accommodating (at present) 518 patients, with provisions for enlargement in the direction of isolation blocks, ambulance station, and other buildings. Cases of scarlet fever, enteric fever, diphtheria, or general fever are accommodated in small isolation wards and blocks for separate treatment. There is accommodation for 360 scarlet fever patients, 120 diphtheria or enteric fever patients, while the remainder of the wards are set aside for isolation purposes. Provision is made for an administrative staff of 324 persons. Advantage was taken of the shape of the ground reserved for the nurses' and domestic servants' blocks to subdivide the dormitory accommodation to a greater extent than had hitherto been obtained, with a result that better classification, with less liability of risks from fire, has been obtained. The ward pavilions are connected by covered ways (with subways under for water, gas, and other mains), with the administrative, laundry, reception, and mess blocks. The whole of the large pavilion blocks are arranged axially due north and south, and are two storeys in height, the ground floor being raised 5 ft. above the level of the airing courts to secure a circulation of air under the pavilion.

Each scarlet fever pavilion contains, on each floor, a ward for twenty beds, and one for two beds, together with ward scullery, bath, sink, and water-closet rooms.

The diphtheria and enteric blocks are arranged similarly, but with twelve beds in the large wards.

NORTH-EASTERN HOSPITAL, LONDON.

The original hospital consisted of a group of temporary buildings, erected in 1892, to deal with an epidemic of scarlet fever. These were erected on a site of about 19 acres, and were intended to be used for one year only. The new build-



North-Eastern Hospital, London.

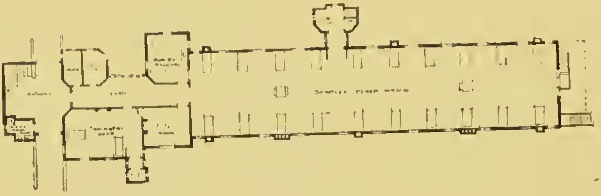
A. and C. Harston, F.R.I.B.A., *Architects.*

ings were erected on additional land; they consist of an administrative block, staff quarters, medical superintendent's and steward's houses, porter's lodge, receiving and discharge rooms, mortuary, dispensary, four diphtheria and enteric blocks, two isolation blocks, and laundry.

The normal number of beds in the reconstructed hospital is about 548 for diphtheria and enteric patients, and eight isolation beds. These buildings were erected from the design of Messrs. A. and C. Harston, London.

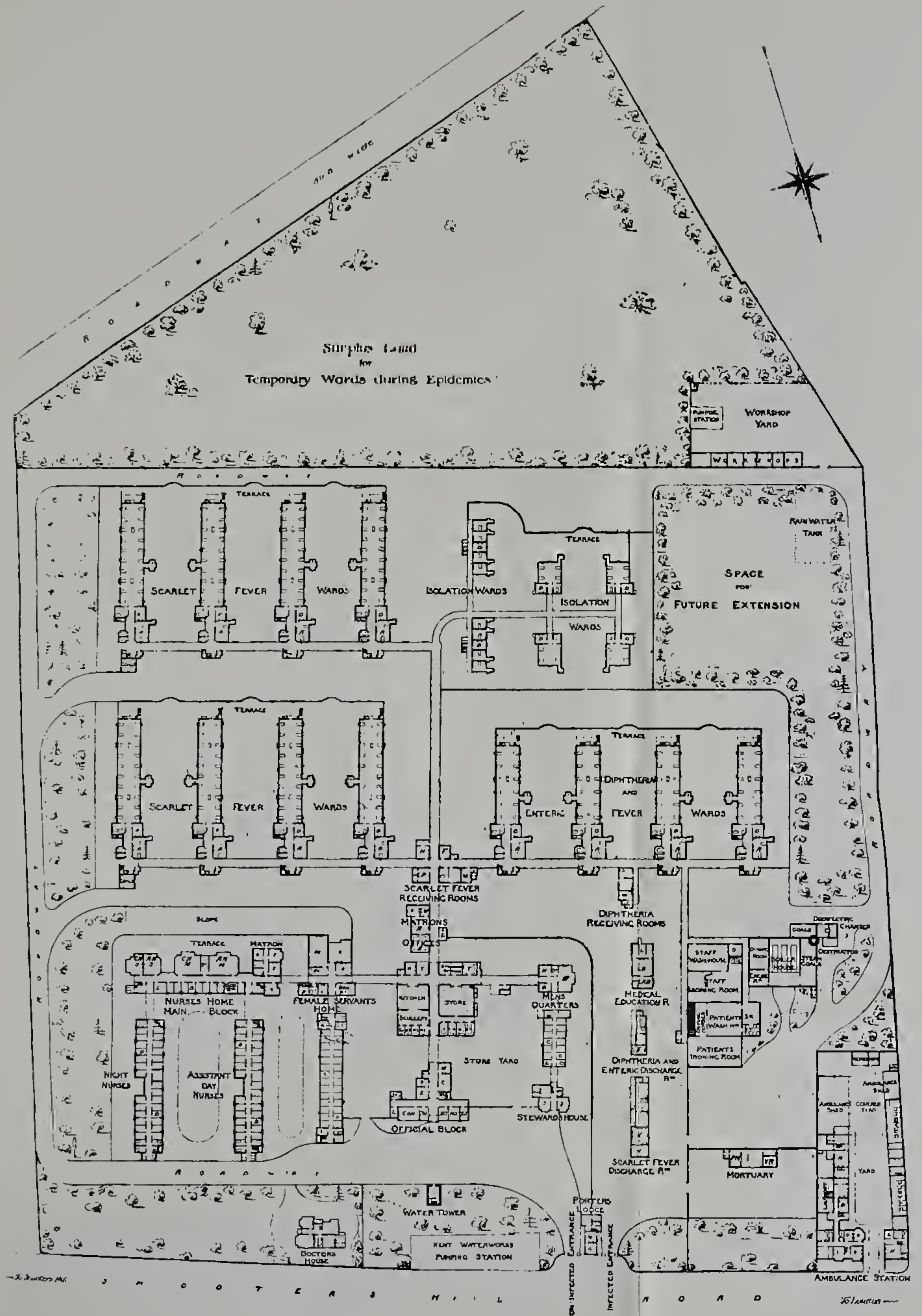
BROOK FEVER HOSPITAL, SHOOTERS' HILL, LONDON, S.E.

The Brook Fever Hospital, Shooters' Hill, was erected by the Metropolitan Asylums Board in 1895. The site of the hospital, which is about 30 acres, stands at an elevation of over 200 ft. above the sea level. The land falling rapidly to the south, the buildings are grouped on terraces facing the south and so shielded from the north and east winds. The front of the site is occupied by the several administrative buildings, which include the official block, the kitchen, stores, matron's department, medical superintendent's residence, and homes for nurses, female servants, and male servants.



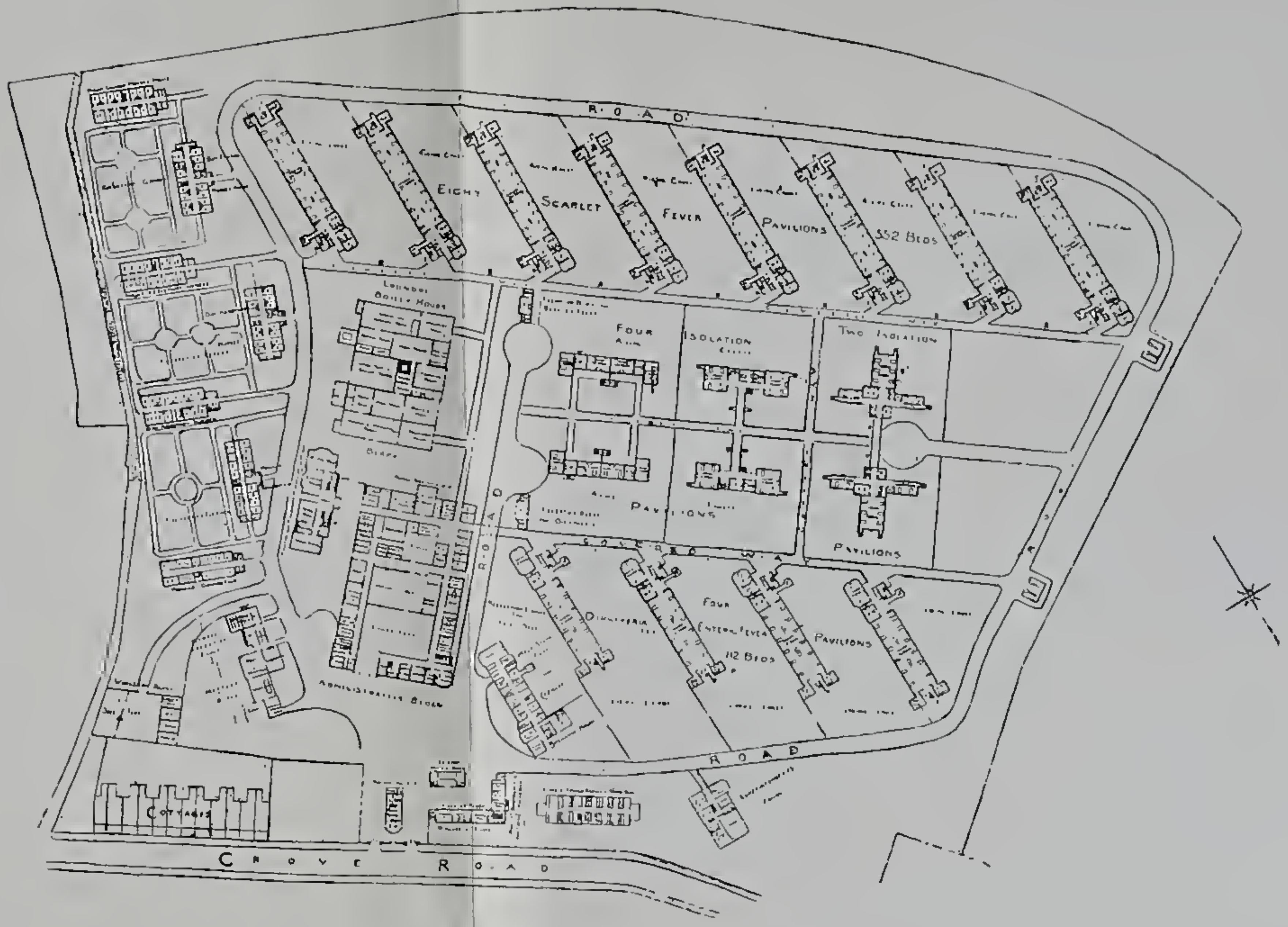
Plan of Pavilion, Brook Hospital.

The infectious pavilions are placed at the rear. They comprise eight two-storeyed pavilions for scarlet fever, built about 6 ft. above the level of the ground, the staircase communicating with the upper floor being cut off from the lower floor. Each main ward contains twenty beds, each bed having 12 ft. wall space, 156 ft. floor space, and 2,028 ft. cubic space. There is provided on each floor a separate



Brook Hospital, Shooters' Hill, London.

T. W. Aldwinckle, F.R.I.B.A., *Architect.*



Grove Hospital, Tooting Graveney, London, S.W.

A. Hessell Tiltman, F.R.I.B.A., *Architect.*

[*To face page* 50.

ward for two beds, with its own water-closet. The ward scullery is placed so as to overlook both the large and the separation ward.

The diphtheria and enteric fever cases are arranged for in four pavilions of a similar character to the last mentioned, but with the provision for twelve beds each, with 15 ft. wall space per bed, 195 ft. floor area, and 2,535 ft. cubic area. The isolation cases are provided for in six one-storey pavilions. Provision is also made of receiving wards, mortuary, discharge wards, doctor's residence, porters' lodge, laundry, etc.

This hospital, which is one of the many examples of good planning and construction, was erected from the design of Mr. T. W. Aldwinckle, F.R.I.B.A., Architect, London.

PARK HOSPITAL, LEWISHAM, LONDON, S.E.

The Park Hospital, Hither Green, Lewisham, stands on a site of about 19 acres in extent. Provision is made of four pavilions for diphtheria, containing 120 beds; eight pavilions for scarlet fever, with accommodation for 368 beds, and six isolation pavilions containing 60 beds.

A porter's lodge and residence are situated near the entrance. A block containing offices, committee room, chaplain's room, etc., is provided centrally. The central administration block contains the residence of the servants, steward's stores, and kitchen buildings. On one side of this block stands the steward's house, and on the other the Assistant Medical Officer's quarters. Provision is also made of discharge blocks and waiting-rooms, mortuary, education block, etc.

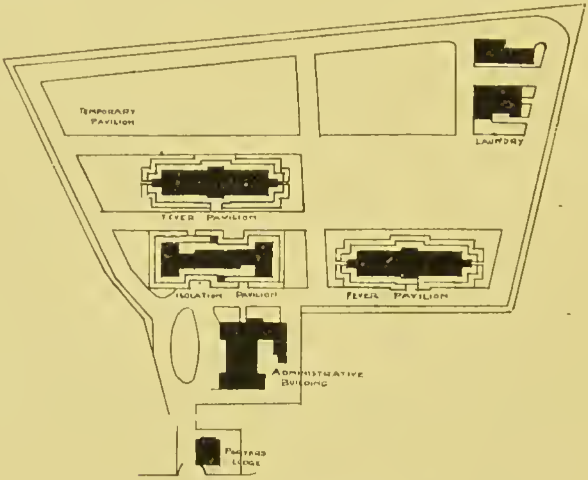
The nurses' home, which provides for 192 nurses, consists of three buildings. The principal buildings are connected with covered corridors. A separate airing court is provided for each pavilion, and airing balconies are provided on each floor of the pavilion.

Provision is made of telephones, and electric fire alarms throughout the buildings, and hydrants for coping with an outbreak of fire are provided in every building, in addition to a steam fire engine which is stationed at the hospital. This hospital, which may be said to be the largest for infectious diseases in the metropolitan area, was erected from the design of Mr. Edwin T. Hall, F.R.I.B.A., London.

WILLESDEN ISOLATION HOSPITAL.

The Willesden Hospital stands on a site of 7 acres of land. The porter's lodge is situated at the entrance, and comprises inquiry office, waiting-room for visitors, and living apartments. The administrative building contains accommodation for the Medical Officer, matron, and a staff of about twenty nurses and servants, in addition to the kitchen and stores.

The hospital buildings provide accommodation for forty-two beds. Two pavilions are planned with two wards, each with eight beds, divided by a nurse's duty room overlooking each ward. The bath-room is also placed in the centre of the block, and faces the duty room. Each ward is provided with a water-closet and slop-sink. The beds in these pavilions are provided with 12 ft. wall space, 156 ft. floor space, and 2,028 cubic space.



WILLESDEN ISOLATION HOSPITAL.
EDMESTON AND GABRIEL, *Architects.*

The isolation pavilion is divided into two blocks by a wall across the centre. Each division contains two wards, one for three beds and one for two beds, with a nurse's duty room between the two. Each block has a water-closet and slop-sink, and on the verandah, from which the wards and duty rooms are entered, is placed a movable bath. These wards are allowed 12 ft. wall space per bed, 216 ft. floor space, and 2,800 cubic feet space. The floors of the pavilions are raised about 4 ft. above the general level of the ground, and are of fire-resisting construction. A terrace 2 ft. 6 in. high and 6 ft. wide is formed round each pavilion.

The laundry, boiler-house, disinfector, mortuary and ambulance house are placed at the rear of the site.

This hospital, like that of the Heathcote, Leamington, is not provided with communicating corridors to the various buildings.

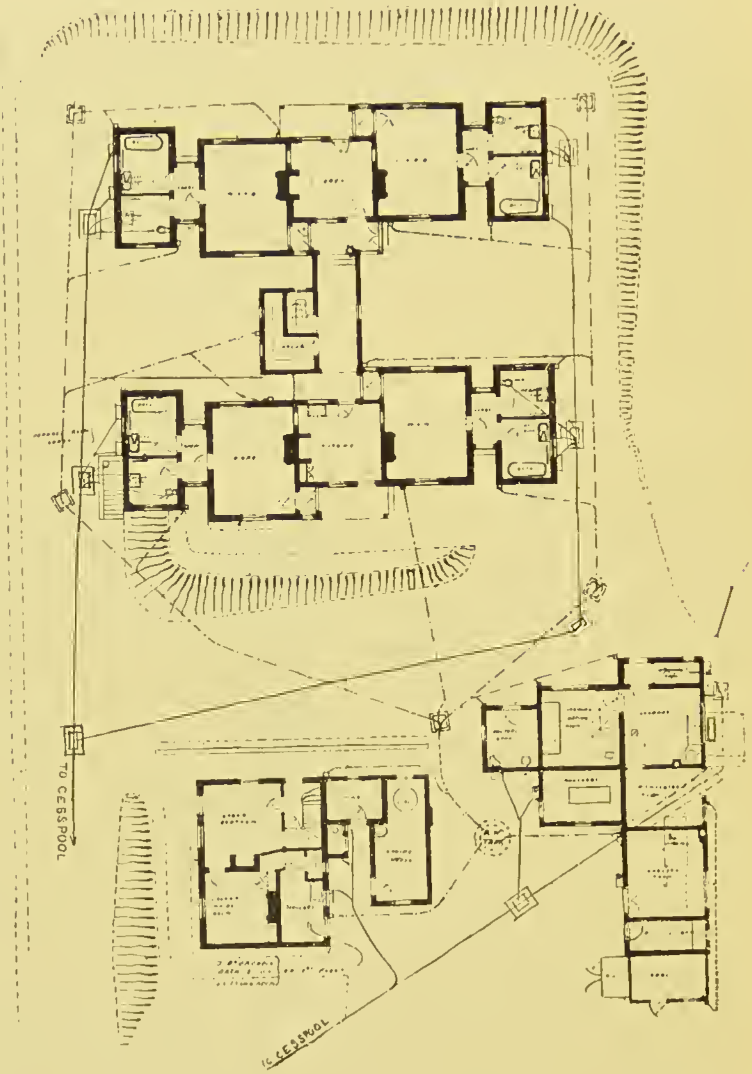
FAVERSHAM HOSPITAL.

We have previously drawn attention to the advisability of studying additions when planning a new building. A striking example of the want of thought as to future accommodation is instanced at the Kennaways Isolation Hospital, Faversham. The following illustration is an excellent example of what *not to do* ; at the same time the folly of not considering future necessities is shown.

The first portion of this hospital, which comprises the administration block (excepting the engine room), and the front ward block, and the laundry, ironing-room and doctor's office were erected in 1891. The rear ward block and connecting corridor between the two pavilions, together with the drug store, were built in 1894. Then, in 1902, the isolation authority erected the engine room as an annexe to the administration block. In 1907 the bath-room, water-closet and sink room at the end of each ward block, the larder leading off the covered way and the mortuary, disinfecting and infected rooms, boots and lamps and steeping tank room were built. So it was from time to time enlarged, resulting in an inefficient administration and a hospital far from satisfactory in every direction.

BOROUCH OF FAVERSHAM.

KENNAWAYS ISOLATION HOSPITAL.



CITY OF BRISTOL.

In tracing the history of disease, and the measures adopted to prevent its spread, in the City of Bristol, we find that so far back as the fourteenth century three leper hospitals existed. In the early years of sanitary reform in Bristol, hospital provision for communicable diseases was associated with the Guardians of the Poor, who were then the only authorities dealing with such matters. In 1849 the nursing of cholera patients was undertaken by the three Boards of Guardians then having jurisdiction within the city, and later, in 1865, the isolation of typhus was also undertaken by these Boards. In 1886 the care of infectious patients was still shared by the Sanitary Authority and the Guardians. The only hospitals belonging to the Corporation at this date were two temporary wooden buildings for twelve patients each, situated close together in a yard in St. Philip's Marsh, quite unsuitable for isolating more than one kind of disease, although nominally intended for fever and smallpox.

The prevalence of smallpox in 1887–8, and the concurrent prevalence of scarlet fever, which had to be disregarded in time of smallpox, emphasized the necessity for more adequate hospital accommodation for scarlet fever.

NOVER'S HILL HOSPITAL.

In 1892, the Sanitary Authority purchased the Nover's Hill site, containing 13 acres, intending to utilize it for complete separate hospitals for fever and smallpox. On making application to the Local Government Board for sanction to a loan, the Board made objections to the treatment of smallpox and other diseases upon the same site. It was therefore resolved to reserve the site for the treatment of smallpox only.

Accommodation is provided in this hospital for fifty-three beds, with a cubic air space of 1,000 cubic ft. per bed. The site is about 2½ miles from the centre of the city and is situated on a hill commanding a wide view of the Dundry range on the one hand, and of the city on the other, and is well isolated.

The ward pavilions are temporary wooden buildings, erected during the smallpox prevalence of 1893–4, but there is a permanent isolation block for eight beds, which is similar in detail to that at Ham Green, hereafter described and illustrated.

The administrative block, which is a permanent building, provides accommodation with kitchen and the usual offices for a resident medical officer, a matron, and twelve bedrooms for nurses and servants, each nurse having a separate bedroom. The laundry provides for the necessary disinfecting and washing of 100 patients.

When this hospital is not in use for the treatment of smallpox, it is proposed to serve as a convalescent home for the relief of pressure on Ham Green.

HAM GREEN HOSPITAL.

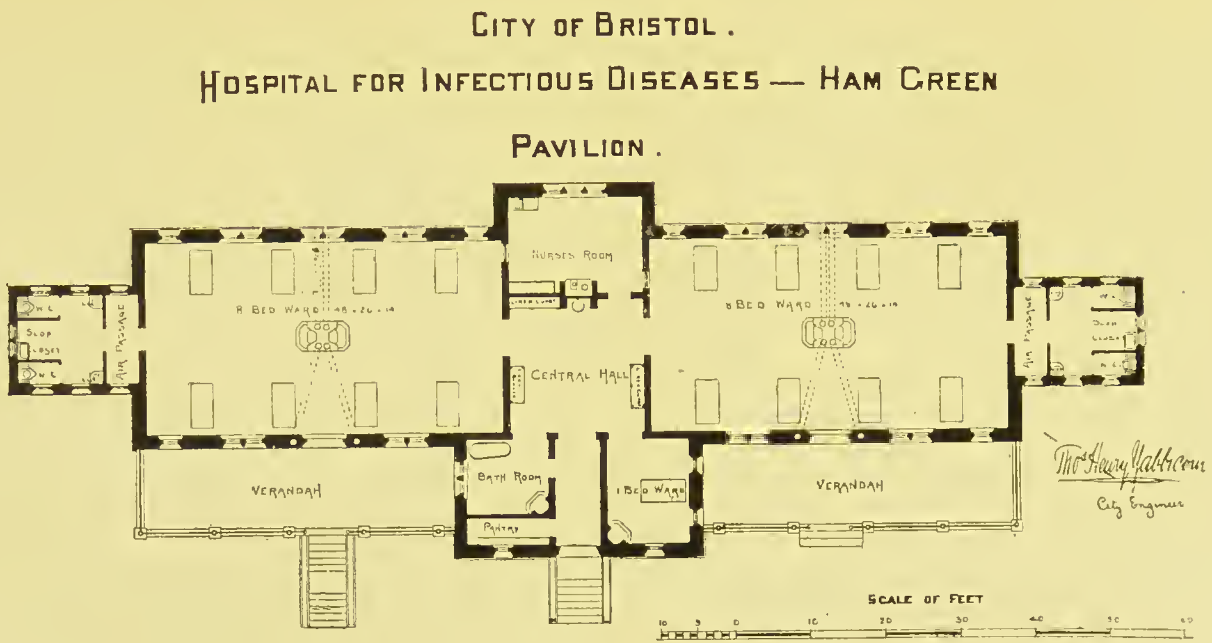
The Ham Green Estate, which contains about 99 acres, and a residential mansion, two farms, and five cottages, was purchased in 1894, for £8,695. Only 38 acres of the site is devoted to hospital purposes. The site is situated about three miles from the Suspension Bridge on the Somerset side of the Avon ; there is a small creek (Chapel Pill), forming the boundary on the north-east, which affords a good approach from the river, with a landing-stage accessible to the Health Committee's steam-launch, and there is a good road from the landing-stage to the hospital grounds. The hospital is also reached by a main road from Bristol.

An extensive view of inland scenery is visible from every part of the hospital grounds, and is, in addition, most eminently suited for the purpose of an isolation hospital.

We are informed that before the design of this hospital was prepared, the City Engineer, Mr. T. H. Yabbicom, M.Inst.C.E., made himself throroughly acquainted with the principle features of the most recently constructed hospitals in England and Scotland, with a result that the city possesses one of the most up-to-date hospitals for the treatment of infectious disease.

After the hospital had been opened three years it was found the accommodation provided was inadequate to meet the requirements of the extended city, so in 1902 it was resolved to erect additional buildings. In describing the buildings we will first deal with those which constituted the original scheme.

Porter's Lodge.—This building is situated on the right of



Plan of Ham Green Hospital Wards.

the entrance; it contains, on the ground floor, a sitting-room, kitchen, scullery and the usual offices; on the first floor there is one bedroom only.

Administrative Buildings.—The mansion standing on the site was altered to suit the requirements of an administrative block of an isolation hospital. The Medical Superintendent's quarters are situated on the south side and contain, on the ground floor, a sitting-room, dispensary and nurses' waiting lobby; also lavatory and a water-closet. On the first floor two bedrooms and the usual offices are provided.

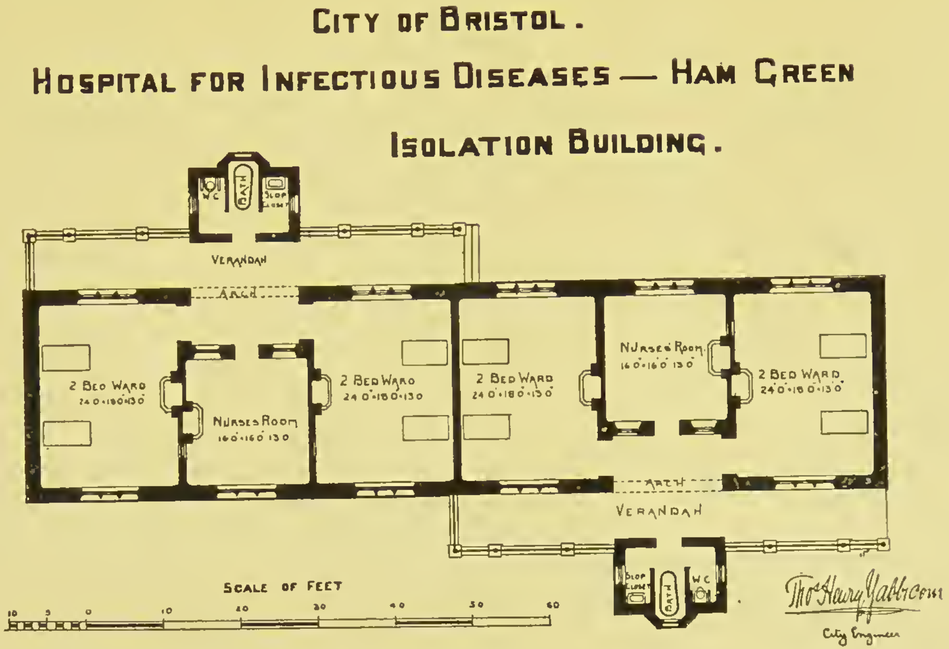
The Nurses' Home is entered through a large entrance hall, a portion of which forms the matron's office. The other rooms, on the ground floor, include matron's sitting-room, charge nurse's sitting-room, nurses' sitting-room, dining hall, serving pantry and the usual offices. On the first and second floors are spacious corridors, from which are entered the bedrooms; also bath-rooms and water-closets, on each floor, while provision is made on the second floor of linen room and house-servants' bedrooms.

The kitchen quarters and stores are arranged at the rear of the principal block, connected on the ground floor by a lobby. The accommodation provided is as follows: servants' hall, general store, larder, pantry, dairy, etc. The kitchen is provided with a cooking installation for 200 persons, comprising a cooking range with two large ovens, two steam-jacketed boiling-pans, one beef-tea apparatus, hot carving table, hot-closet for plates, etc. In the scullery a battery of four steaming closets is provided for cooking fish, vegetables, etc. The whole of the steam used for cooking is supplied from a vertical boiler fitted with an automatic feed tank.

The food for the patients is prepared in the kitchen of the main administrative block and conveyed to the various pavilions in heated wagons.

Adjoining the kitchen is a cook's pantry; provision is also made, on the ground floor, of boot-room and the usual offices. On the first floor servants' bedrooms are provided.

When this hospital was enlarged (in 1904), in order to provide additional accommodation for the staff, a wing was built on the west side of the administrative block, containing on the ground floor a work-room, store-room, cook's pantry, stationery cupboard and four dormitories for servants, each 17 ft. by 13 ft., and containing three beds; also one single bedroom, in addition to the usual offices. On the



HAM GREEN HOSPITAL, BRISTOL. PLAN OF ISOLATION PAVILION.

first floor thirteen bedrooms were provided for nurses, each 13 ft. 4 in. by 8 ft. 3 in. ; also a bath-room and water-closet.

Ward Blocks.—The four pavilions provide accommodation for seventeen beds each. They are designed in a late-Gothic style of architecture, and are carried out in red Cattybrook bricks with freestone dressings. The roofs are covered with Port Madoc and permanent green slates, laid in alternate bands.

The pavilions are situated about 60 ft. apart, each pavilion containing two large wards for eight beds each, in size 48 ft. by 26 ft. They are 14 ft. in height. Provision is also made, in each pavilion, of a single-bed ward, nurses' room, bath-room and the usual offices at the end of each ward, disconnected from the wards by a cross-ventilated lobby.

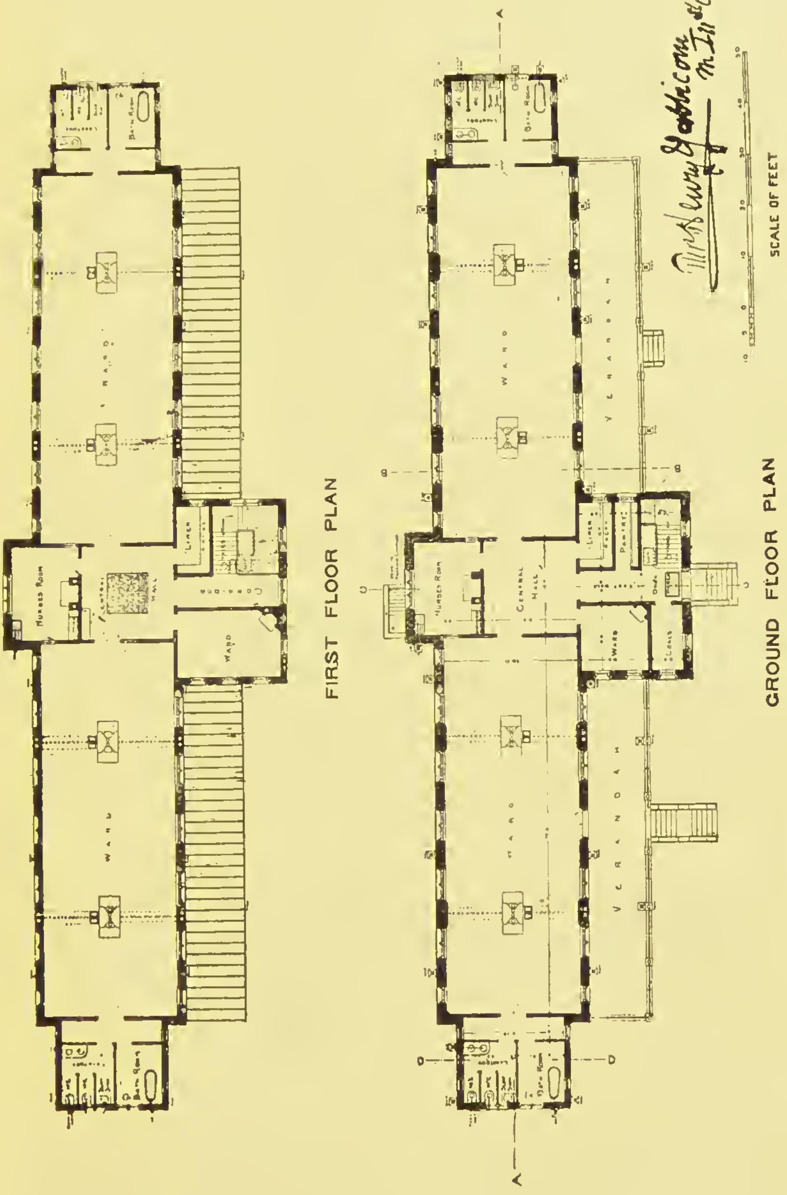
In the front of each ward is a verandah 10 ft. wide, having a west aspect, and running the entire length of the ward.

Provision is made of 2,184 cubic ft. air space and 156 sup. ft. floor space for each patient. The window space, per cubic contents of the wards, is about 1 ft. sup. to every 70 cubic ft.

Isolation Pavilion.—This block consists of four wards, arranged in pairs, one series of wards, with nurses' room between, facing the east, the other facing the west, thus being quite distinct from each other. Each ward and room opens directly into the open air under the verandah, and has no communication with the others. Each pair of wards is provided with separate water-closet, slop-sink and bath-room with a movable bath, in a detached block leading off the verandah. The wards are planned for two patients in each, or eight in the entire block, with an allowance of 2,000 cubic feet per patient.

New Fever Pavilions.—This building provides accommodation for fifty beds, and is erected to the west of the other pavilions. The chief point in which the new pavilion differs from the others is that, in addition to containing a larger number of beds, the wards are arranged on two floors, one above the other, thus economizing space, and reducing the cost by saving the duplication of foundations, roofs and drainage. This is fully exemplified by a comparison of the cost, the one-storey pavilions costing £296 per bed and the two-storey pavilions £246 per bed, showing a saving of £50 per bed.

On entering the building on the ground floor, and passing



FIRST FLOOR PLAN

GROUND FLOOR PLAN

HAM GREEN HOSPITAL, BRISTOL. PLAN OF NEW PAVILION.

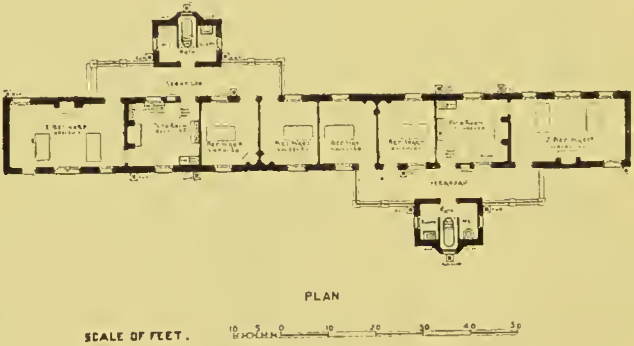
through the vestibule, the central hall is reached, out of which all the other rooms open.

To the north and the south are the wards, each containing twelve beds. They are 72 ft. long, 26 ft. wide and 13 ft. high, and provide a cubic air space per bed of 2,028 ft. In the east wing is situated the nurses' duty-room, with an inspection window overlooking each ward. In the west wing is a one-bed ward 13 ft. by 12 ft. by 13 ft. high, linen-room, coal store and pantry.

Adjoining the north and south wards, and separated therefrom by a cross-ventilated lobby, 4 ft. wide, are the offices, containing bath-room, size 11 ft. 6 ins. by 9 ft., lavatory, two water-closets, and slop-sink. The wards and offices on the first floor are similar to those already described on the ground floor. They are completely isolated from each other, the upper floor being approached by a stone staircase, 5 ft. wide. On the west side of the wards, on the ground floor, are verandahs, 12 ft. wide, running the entire length of the same, with double doors opening direct from the wards, affording facility for patients' beds being moved out in suitable weather.

In the well of the staircase a lift is provided for taking coal up to, and removing soiled linen, etc., from the first floor. The central hall on the upper floor is lighted from above by a turret, which forms an important architectural feature of the building, and the rays of light, entering and falling upon a pavement light fixed in the floor, pass through to the hall below.

New Observation Wards.—This pavilion, which is erected



Ham Green Hospital, Bristol. Plan of Observation Ward.

on the west of the principal entrance, is provided for the reception of cases requiring special observation, and to enable the Medical Superintendent to diagnose a case before drafting it into the fever pavilion. It will also serve the purpose of nursing isolated cases, thus saving the necessity of devoting a large pavilion to this purpose. Provision is made for eight beds, divided into two sections, each being solated from the other and provided with separate entrances. Each section contains two one-bed wards, in size 13 ft. by 12 ft. by 13 ft. high and a one two-bed ward, size 24 ft. by 13 ft. by 13 ft. high. A nurses' duty-room, size 15 ft. by 13 ft., is provided, fitted with a small cooking-range, sink, dresser, coal store and linen cupboard.

Each ward opens direct on to a verandah, 40 ft. long and 8 ft. wide. The offices are detached from the wards, but are easily accessible.

Discharge Block.—This building is situated on the east of the principal entrance, and in the vicinity of the porter's lodge. It contains a waiting-room, size 12 ft. by 7 ft. 6 in., for the use of relatives and friends meeting discharged patients, undressing and dressing-rooms, bath-room, etc.

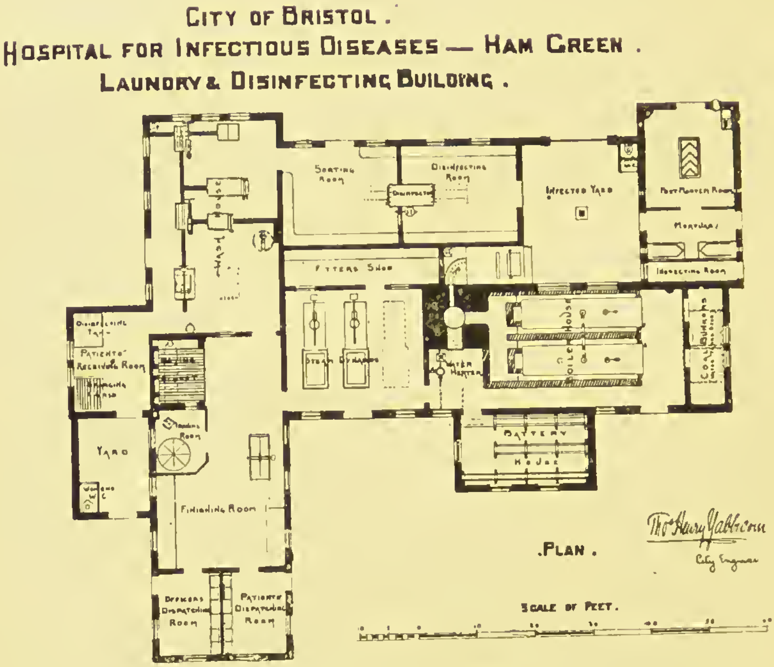
Laundry, etc.—The laundry building, which is situated to the north of the porter's lodge, comprises laundry, disinfecting rooms, boiler-house, battery house and mortuary, etc.

The boiler-house contains two Cornish boilers, each 20 ft. long by 5 ft. diameter, to work at a pressure of 80 lb. per square in. They supply the necessary steam to the disinfecting and washing apparatus, and also to the electric plant and pumps. The engine and dynamo house contains the generating plant for the electric lighting of the whole of the institution. Adjoining the engine house is a fitters' shop and battery room.

The washhouse is fitted up with the most up-to-date machinery and provides for the patients' and the staff clothing being separately washed. The finishing room contains a drying closet with nine sliding horses. This closet is heated by a special tubular steam heater, through which the air is forced into the closet by means of an air propeller driven from the main shafting.

Separate clean clothes despatching rooms are provided, one for the patients' and the other for the staff linen, each fitted up with sorting racks and tables, and warmed by means of steam radiators.

In the infected yard is fixed an incinerator for destroying bandages, bedding and other articles unsuitable or too badly



Ham Green Hospital, Bristol.
Plan of Laundry.

soiled for disinfection. The disinfecting room is fitted with a steam disinfector. At the rear of the laundry building is the mortuary, which contains two slabs; and adjoining is a small inspection room, fitted with a window, which enables relatives or friends to view the deceased without any chance of infection.

The post-mortem room, adjoining the mortuary, is fitted up with a slate table, white glazed sink and a lavatory.

Stables.—The stables provide accommodation for eight horses—six stalls and two loose boxes—and house for ambulances. On the first floor of this building a living-room is provided for the stableman.

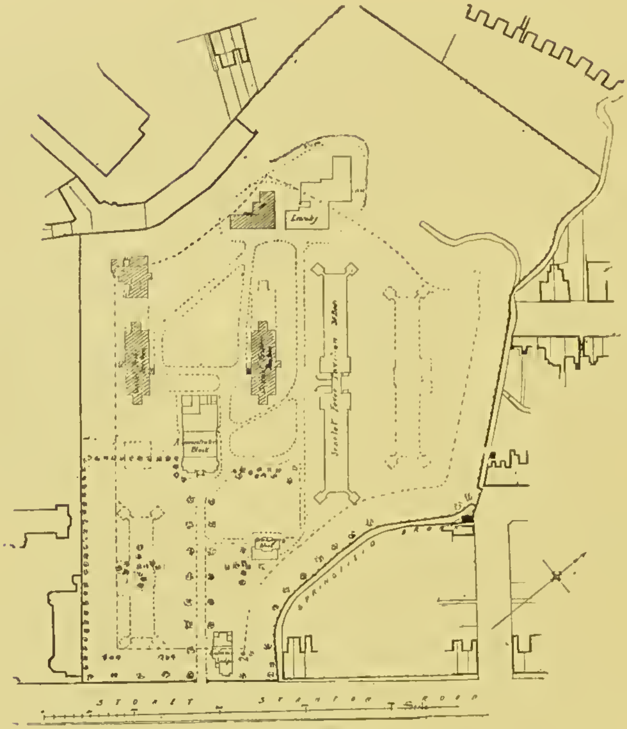
Fire Appliances.—Ample provision has been made throughout the buildings for fire extinguishing. Fire hydrants, hose and delivery pipes are placed in the end of each pavilion and on each floor of the administrative buildings; also in the kitchen and stores. In addition, ground hydrants are placed near each building, and two stand pipes with outlet for instantaneous coupling and bayonet bottom joint, with spare lengths of hose and delivery pipes, are kept in a special house in a central position.

The water for the establishment is obtained from the mains of the Portishead Water Company, but to insure a constant supply to the hospital, a tank capable of storing 30,000 gallons has been constructed on the site. The tank is of cast iron and is elevated on trussed steel stanchions to such a height above the tops of the highest buildings as to provide for an effective discharge of water in case of fire.

The whole of this hospital was erected from the design and under the superintendence of Mr. T. H. Yabbicom, M.Inst.C.E., the City Engineer, and his resident assistant, Mr. H. W. Harding. We are indebted for the plans and the general description of the building to a publication issued by the Health Committee of the Corporation of Bristol, which also contains information on infectious diseases furnished by Dr. D. S. Davies, M.D., the Medical Officer of Health for the city.

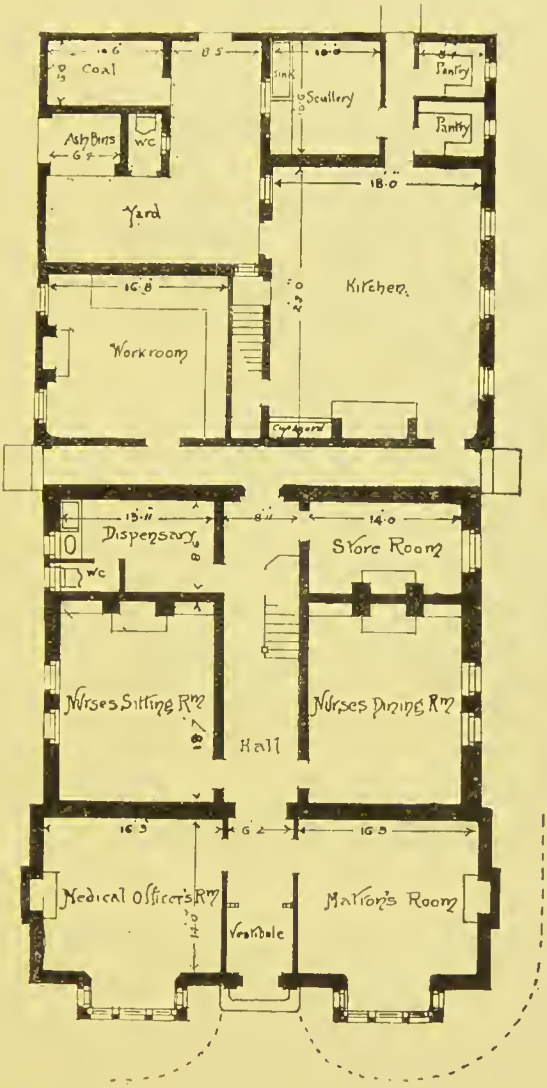
CITY OF COVENTRY.

INFECTIOUS DISEASE HOSPITAL.



Plan of Site.

J. E. Swindlehurst, *City Engineer*, Coventry.

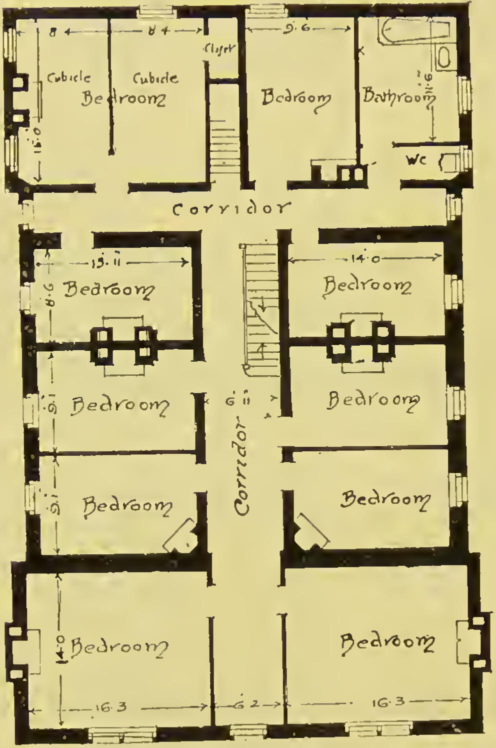


GROUND PLAN.

CITY OF COVENTRY.

PLAN OF ADMINISTRATIVE BLOCK.

J E. SWINDLEHURST, *City Engineer*, COVENTRY.



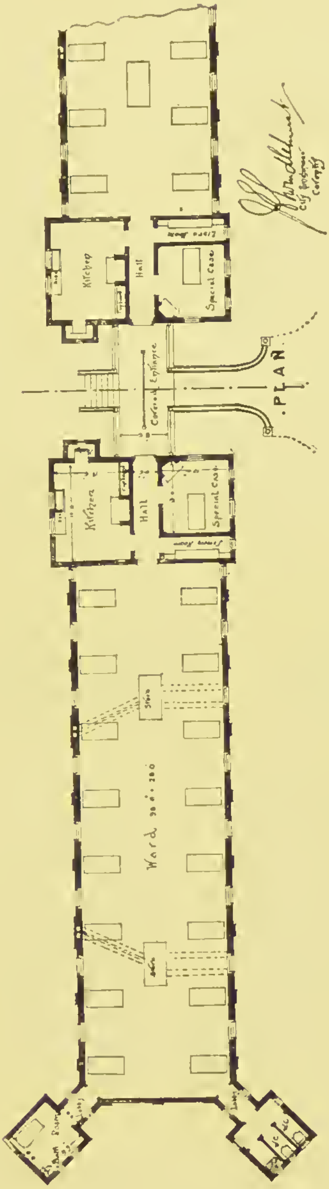
First Floor Plan.

J. E. Swindlehurst

City Engineer, Coventry.

CITY OF COVENTRY.

Plan of Administrative Block.



CITY OF COVENTRY.

Plan of Ward Pavilion.

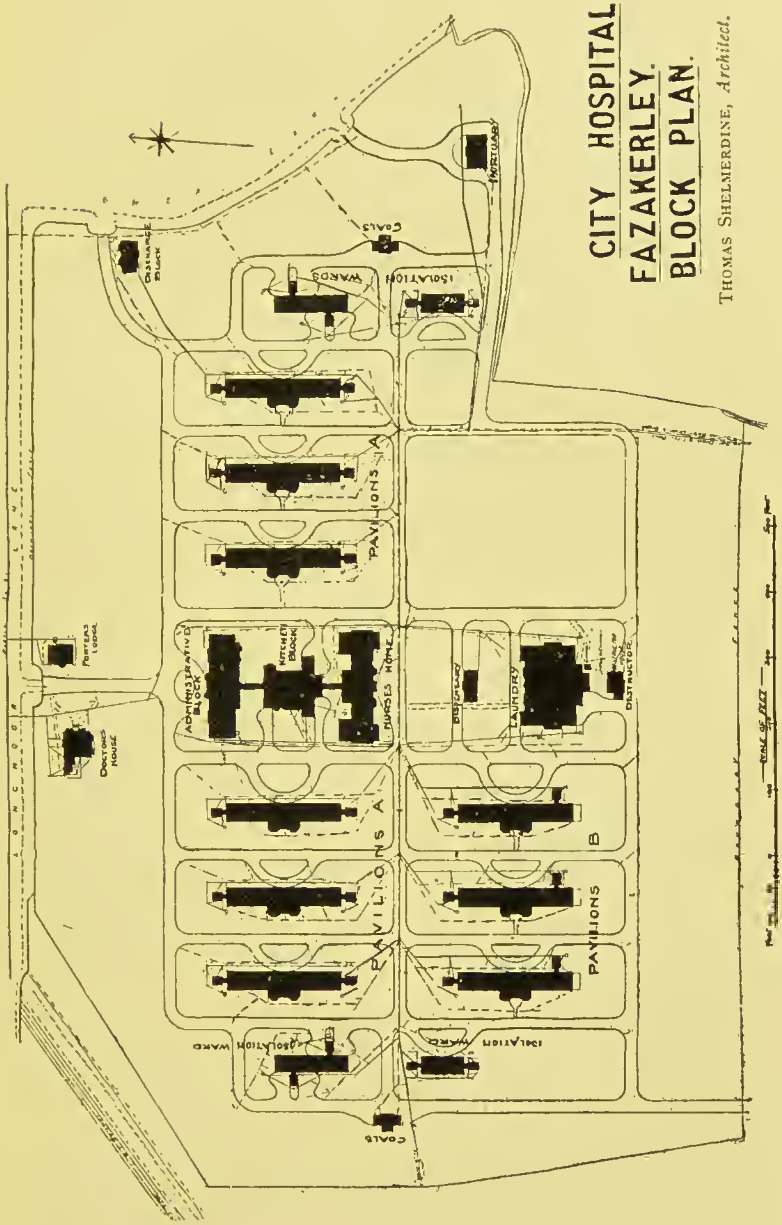
LIVERPOOL.

City Hospital, Fazakerley.

The sanitary precautions to safeguard the health of seaport towns of such magnitude as Liverpool call for exceptional measures being adopted to prevent the spread of infectious diseases, more particularly when we consider the enormous immigration into such cities. In 1847 this city had to deal with a very severe epidemic. In many of the crowded quarters dysentery and smallpox spread with alarming rapidity. This caused hospital after hospital to be opened in different parts of the city. The total deaths during this year reached 21,129, of which 381 were due to smallpox, and 2,589 to diarrhœa and dysentery, and 5,845 to fever. Early in the year 1849 a family of emigrants arrived suffering from cholera. With the approach of summer this disease became epidemic, and in the course of the year no less than 17,000 deaths were registered, of which 7,000 were directly ascribed to cholera and applied diseases. In this year the General Board of Health of the Privy Council—whose position corresponded with that of the Local Government Board of to-day—issued special orders, under the Diseases Prevention Act, to deal with the emergency by authorizing the removal of the sick, or the healthy, from rooms where cholera or other zymotic disease has appeared.

The sanitary administration of the city fell on either the Select Vestry in the parish of Liverpool, or the guardians of the West Derby Union in the extra-parochial district, which at that time included Toxteth. The provision of hospital accommodation rested with these bodies; but it appears to have been principally made by the Select Vestry.

Temporary hospitals were erected in Queen Anne Street and Vauxhall Road; in Ansdell and Chipping Street, in the Toxteth district; and at Harpur Street and Brownlow Hill. The Diseases Prevention Act, designed only to meet epidemic emergencies, ceased to take effect at the close of the outbreak. The temporary isolation buildings, with the exception of those at Brownlow Hill, were pulled down, and so far as hospital accommodation for the prevention of spread of disease were concerned, the city was once more in the same



CITY HOSPITAL
FAZAKERLEY.
BLOCK PLAN.

Thomas Shelmerdine, *Architect.*

position as it was at the commencement of the outbreak. The temporary hospital at Brownlow Hill was maintained until 1863, when the new fever hospital at Brownlow Hill was erected, with accommodation for 160 beds, at a cost of £6,000.

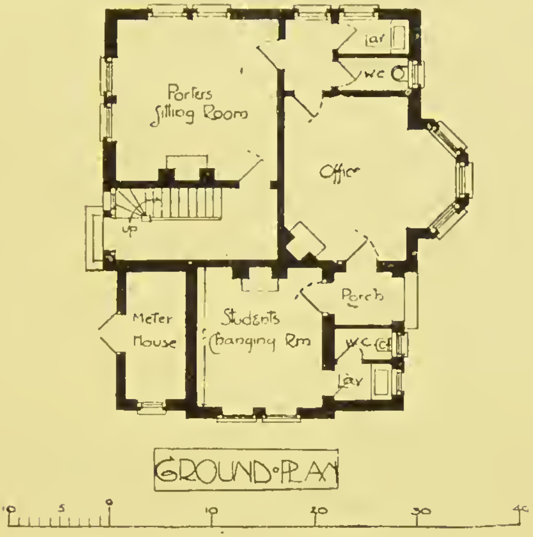
The year 1866 was another serious one for the city, owing to increased prevalence of typhus fever, the actual mortality from this disease amounting to about 1,523. That dreaded disease, cholera, was again imported into the city, whilst the work of the Sanitary Authorities was hampered by the fact that there were a number of common lodging-houses exempt from supervision, owing to the circumstance that these houses were licensed for the sale of intoxicants. Many were overcrowded, and it was from these lodging-houses that the earliest vicious disease was registered. The year 1883 witnessed the extinction, at all events in epidemic prevalence, of typhus fever. It was now acknowledged that the only way of effectually checking the disease, which in 1882 and 1883 had caused 593 and 540 deaths respectively, was to adopt means of isolating in hospitals those who were infected at the earliest possible manner. Up to this date the Sanitary Authority had not yet arisen to a sense of its obligation in the matter of isolation hospital accommodation, and the various Boards of Guardians were looked to to provide accommodation in their workhouses for all cases of disease.

In 1844 the Medical Institution was approached for their views as to the number of beds that should be provided for infectious cases. The reply of this body was a very definite one; they suggested a minimum of 400 beds, in addition to 150 beds for smallpox—the population at that time being 541,031. This number represented that recommended by the Medical Officer of Health, and in response the Grafton Street Hospital was erected in 1888, with accommodation for eighty-eight beds.

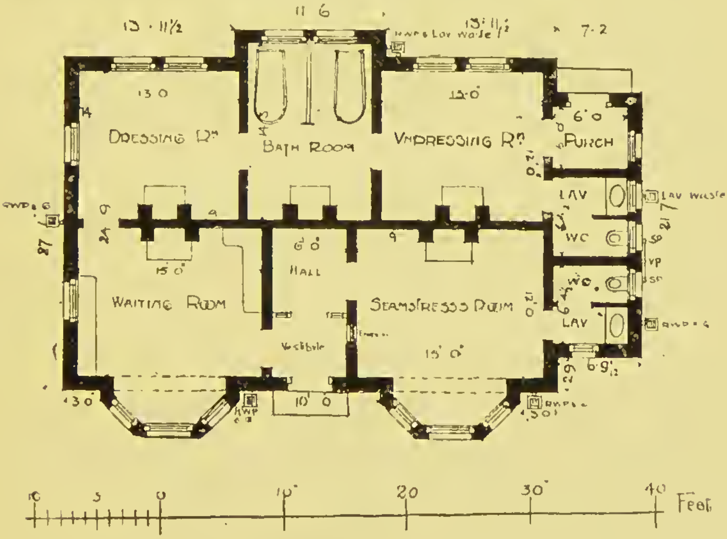
Having given a brief description of the history of the provisions made from time to time to cope with infectious diseases, we will now turn to the provision of the new city hospital at Fazakerley.

In 1898 the Harbreck Estate, at Fazakerley, was offered for sale. This site, which comprises 118 acres, was purchased, with the sanction of the Local Government Board, at a cost of £39,915, being equivalent to 1*s*. 5*d*. per square yard; the object of its purchase being the provision of one hospital

PORTERS' LODGE



DISCHARGE BLOCK.



with 160 beds for smallpox, and a permanent hospital with accommodation for 350 beds for the treatment of the infectious diseases. The smallpox section, which comprises one brick pavilion, four timber pavilions, an isolation pavilion with discharge block, mortuary and coal-house, etc., was completed in 1901. The staff are housed in Harbreck House, which was altered and extended to suit the purpose. The smallpox hospital is entirely separated from the new hospital, the distance between the two being about 500 yards.

The city boundaries were extended in 1895, but some of the incorporated districts had already taken steps towards meeting the requirements for the isolating of infectious cases. On incorporation it was found necessary to largely extend the small hospital at Mill Lane, which now has accommodation for 140 patients.

The New Hospital.

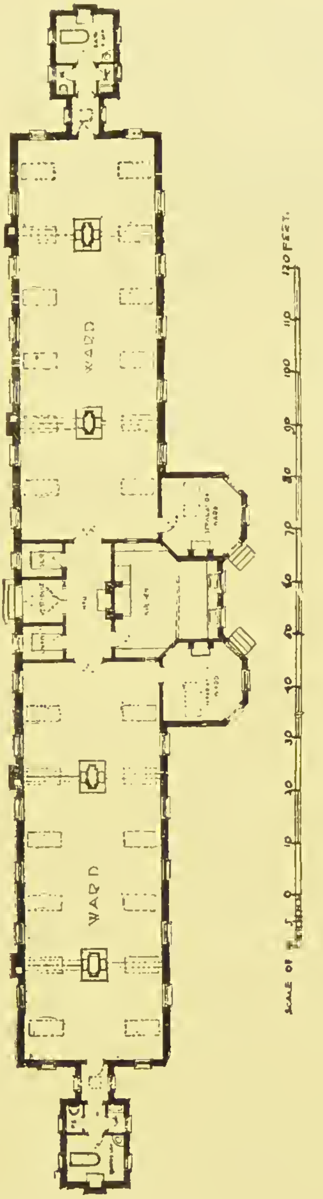
These buildings, which extend over a portion of the estate —about 35 acres—are placed north and south, with a distance of about 100 ft. between each pavilion.

Entering the hospital grounds from Longmoore Lane, the residence of the Medical Superintendent is approached on the right, then, on the opposite side of the entrance, is the porter's lodge.

The wards and isolation pavilions are placed to the east and west of the administrative buildings; their axis running north and south. They are one-storey buildings, 100 ft. apart. To the south of the nurses' home is situated the laundry, and between these buildings the office, laboratory and dispensary. To the extreme left of the porter's lodge is the discharge block, and in the south-east corner the mortuary stands, adjoining an entrance to Lower Lane.

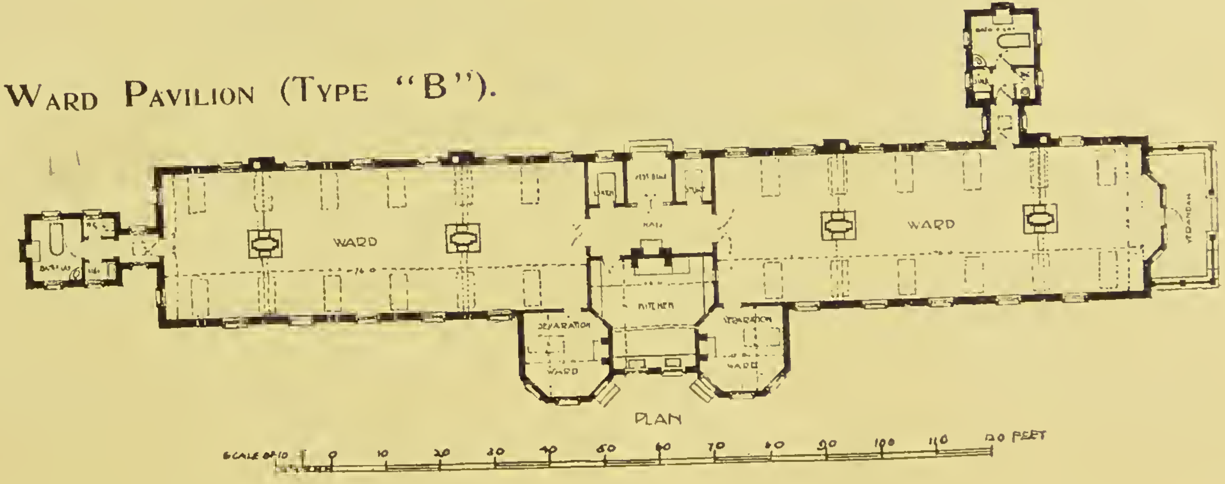
There are three coal depôts, on the east, west, and south sides, and in connexion with the latter a refuse destructor is provided.

Ward Pavilions (Type A.).—There are six pavilions of this type, each comprising two twelve-bed wards and kitchen or duty room. The kitchen is situated with an inspection window overlooking both wards. On one side of the entrance is a small larder, and on the other a linen store. A small wardrobe is provided in the vestibule for doctors' and nurses' overalls, etc. The main wards are 76 ft. long, 26 ft. wide



WARD PAVILION (TYPE "A").

Ward Pavilion (Type "B").



and 13 ft. high. Three of these pavilions, to the east of the site, are fitted with bed-pan cupboards, placed under the sink, and are ventilated direct to the outer air. In addition to the two main wards there are two private wards, each for one bed. These wards are provided with separate entrances.

Type "B."—There are three ward pavilions of this type, each having verandahs at the southern end. One of the sanitary annexes to each of the pavilions is placed at the side instead of at the end of the building. In all other respects these pavilions are similar in every respect to that of the type "A."

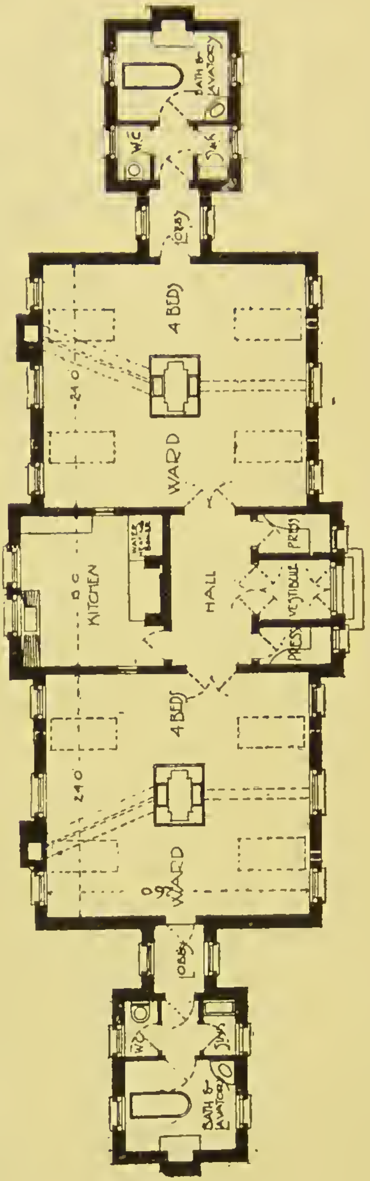
With regard to the artificial lighting of these wards, a portable wall bracket is fixed over each bed for reading or inspection purposes, in addition to the pendants in the centre of the wards. The wards are heated by double ventilating stoves, and warm air is drawn in and distributed by electric fans placed under the floors. The wards are ventilated by the windows in the external walls, the upper part of which are constructed as hoppers, and, in addition, hit-and-miss ventilators are placed under each bed, and Sherringham ventilators on the walls between the beds.

The sanitary annexes to the wards are placed at the ends of the buildings (except in the case of the three southerly pavilions and two of the isolation pavilions), and consist of slop-sink, with hot and cold water supplies, water-closet and bath-room. They are separated from the wards by a cross-ventilated lobby.

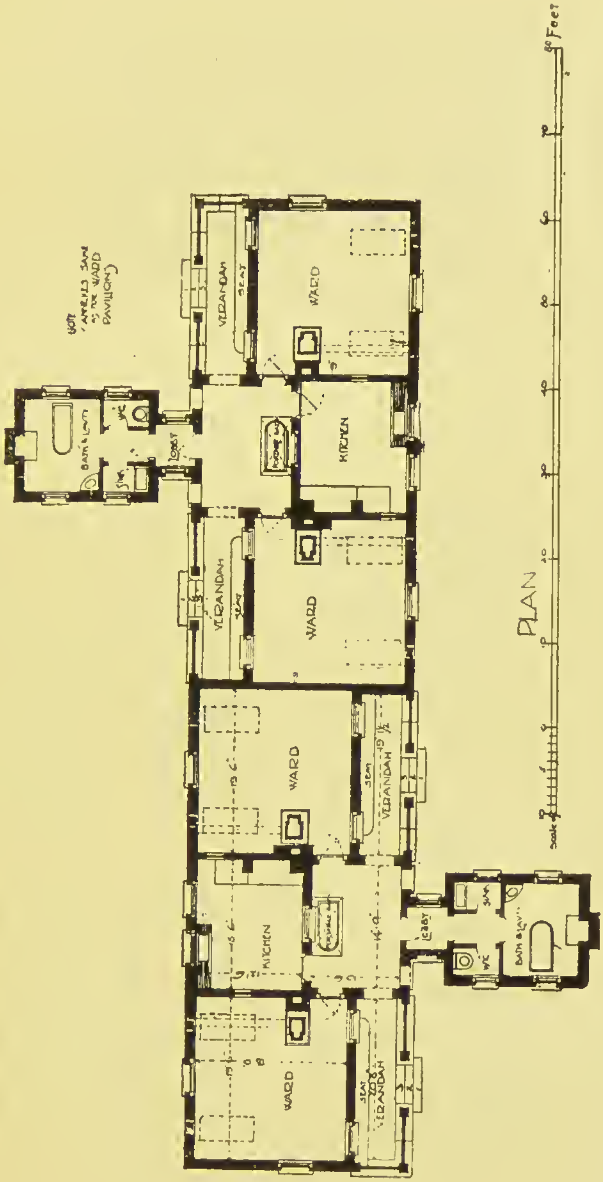
Isolation Pavilions.—These pavilions are planned in a similar manner to the general fever wards, type "A." Each pavilion consists of two wards for four beds each, with an entrance and duty room between the sanitary annexes at each end. The pavilions of the type "B" are in two separate or distinct portions, each having two wards for two beds each, with a duty room between and sanitary annexes placed at the sides.

A movable bath is placed outside each duty room for the use of these wards.

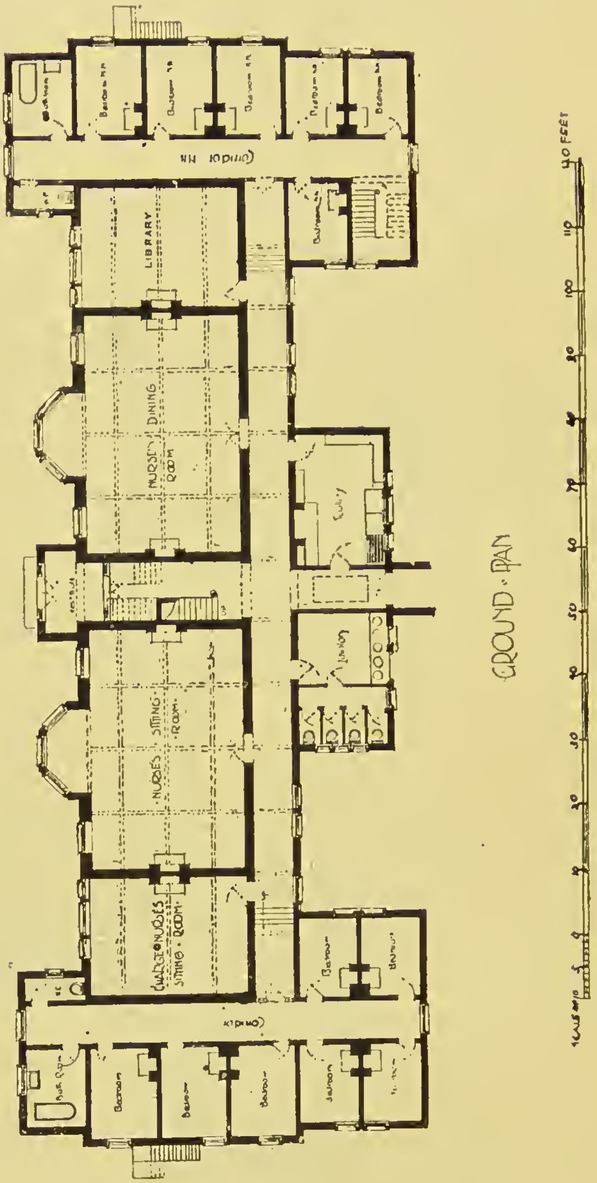
Administrative Building.—Provision is made in this building for the assistant medical officer, matron, and maids. On the ground floor are the office, matron's, doctors', and maids' dining-room and sitting-rooms, doctors' bedrooms, house-keeper's room, and waiting-room for persons having business to transact with the hospital.



Isolation Block (Type "A").



ISOLATION BLOCK (TYPE "B").


LIBRARY
NURSES' DINING ROOM
NURSES' SITTING ROOM
CHARGE NURSES' SITTING · ROOM
Corridor
GROUND · PLAN
40 FEET

NURSES' HOME.

On the first floor the following accommodation is provided: matron's bedroom, cook's bedroom, and twenty-four maids' bedrooms, in addition to sick-room, linen store, bath-room, etc. On the second floor twenty-eight bedrooms for maids', sick room, and linen stores, etc.

Nurses' Home.—The nursing staff of the hospital is housed in this building. Provision is made on the ground floor of nurses' sitting-room, dining-room, charge nurses' sitting-room and library; the whole so situated as to command a southern aspect.

At the west end of the building, separated by doors, are bedrooms for six night nurses. These rooms are so situated as to obtain quietness. In a corresponding position, on the east side, seven bedrooms for day nurses are provided. On the first floor the following provision is made: twenty bedrooms for day nurses, five bedrooms for night nurses, assistant matron's sitting-room and bedroom, linen stores, box-room, and the usual offices.

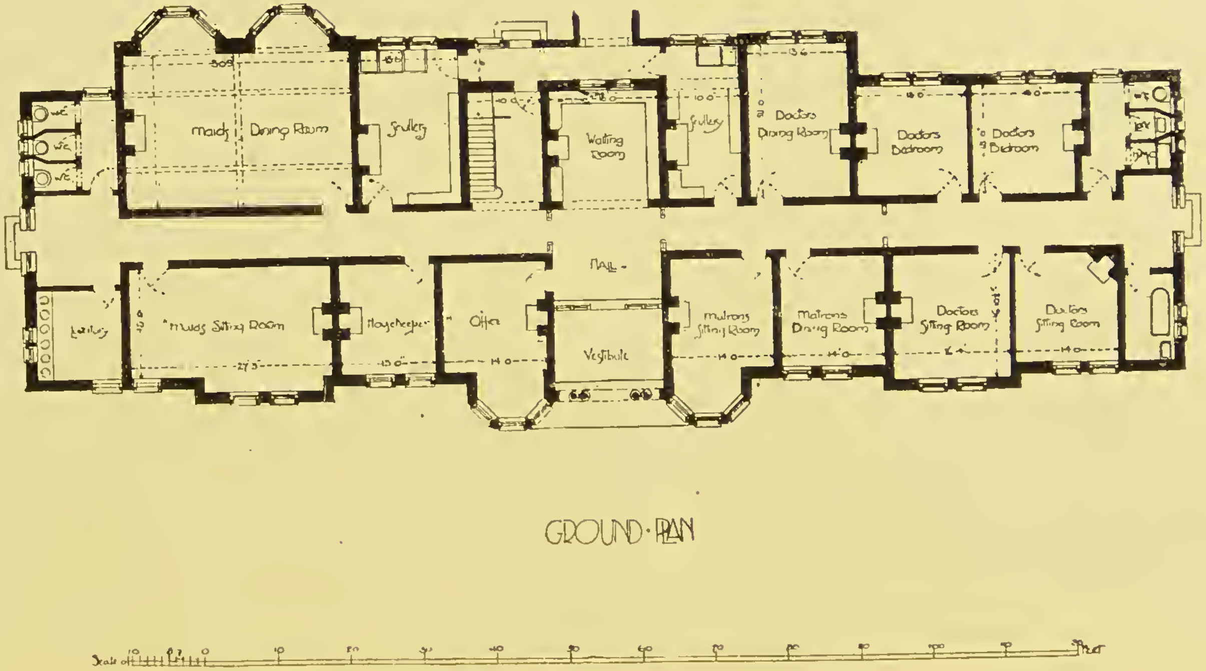
On the second floor the accommodation is of a similar character, including housekeeper's rooms, twenty-two day nurses' and five night nurses' bedrooms. Each of the nurses' bedrooms are in size 12 ft. long by 9 ft. wide, and provided with an open fireplace.

Kitchen Block.—The kitchen buildings are situated between the administrative block and the nurses' home, and connected to both by means of a covered corridor. In the large kitchen, which is 29 ft. 3 in. by 27 ft. 8 in., the cooking for the whole of the hospital is performed. It is fitted with the most modern appliances. The following cooking appliances are provided: one close-fire range, with two ovens; three gas ovens and two toasters; milk sterilizers; two jacketed pans; steam-heated hot-water boiler; steam-heated hot-plate; carving-table and hot closet.

The scullery, which is 22 ft. by 18 ft., adjoins the kitchen. It is fitted with gas-boiling hearth; one range of steaming ovens; jacketed pans, jib crane and basket. A vegetable store opens off from the scullery, and a small pantry, lavatory and water-closet, open from the other side. Provision is also made in the scullery of a coffee roasting and grinding machine and a meat mincer. The whole of this machinery is driven by electric power.

The following accommodation is also provided on the ground floor of this building: servants' mess-room, porters'

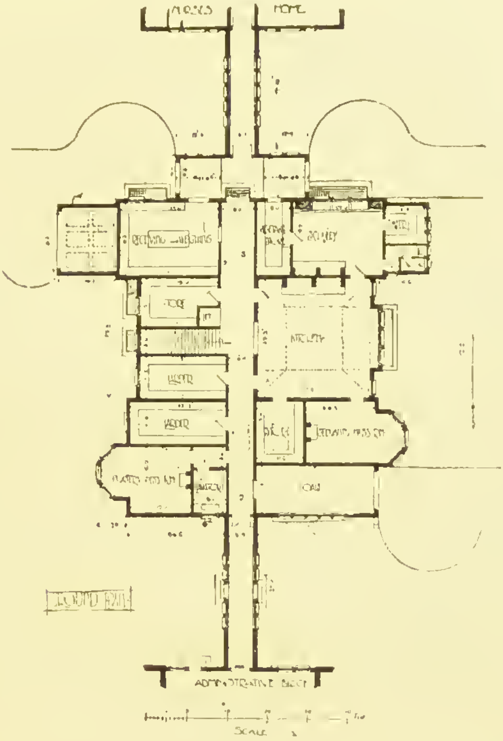
ADMINISTRATIVE BLOCK.



mess-room, receiving and weighing room, stores, larders and coals.

In the basement, under the kitchen, there are store-rooms

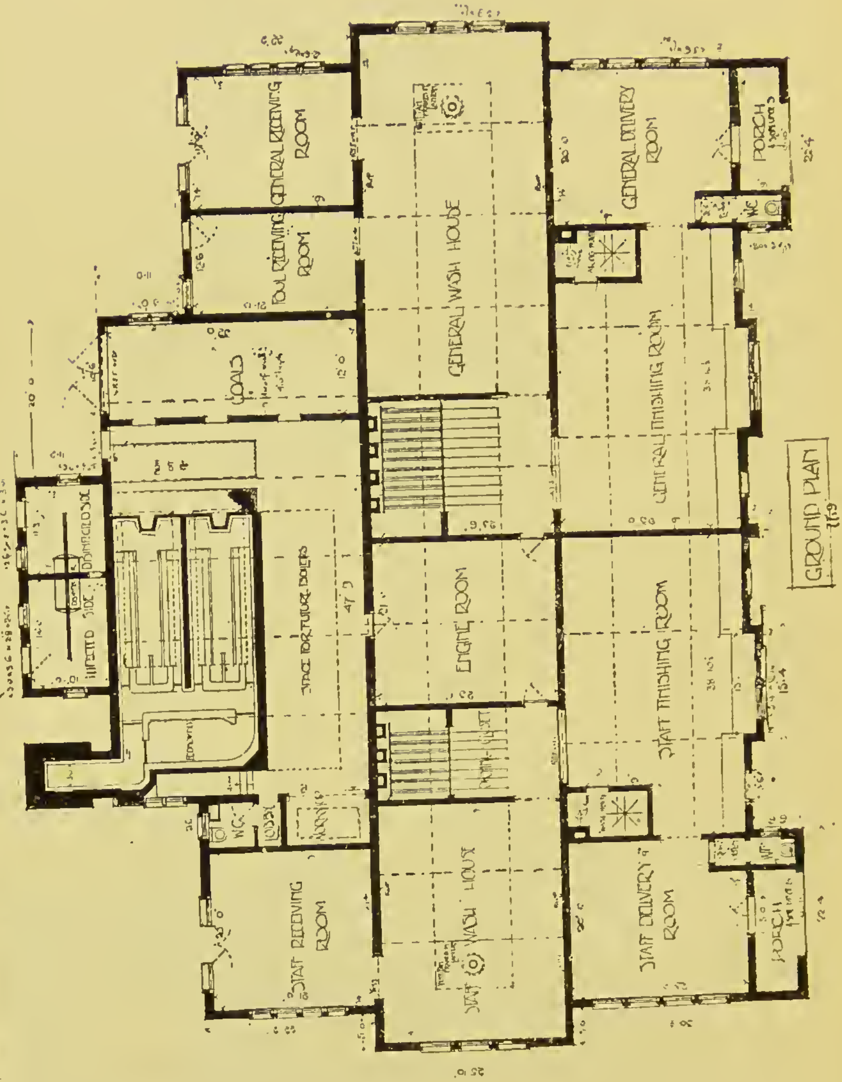
KITCHEN BLOCK



and wine cellar ; and a lift for conveying goods from the ground to the basement floor.

Laundry. — This building comprises the following : general washhouse, delivery room, finishing room, fuel receiving and general receiving rooms. Provision of separate apartments for the staff washing is also made. At the rear of the laundry are the boiler-house, engine-room, workshops, coals and disinfecting chambers.

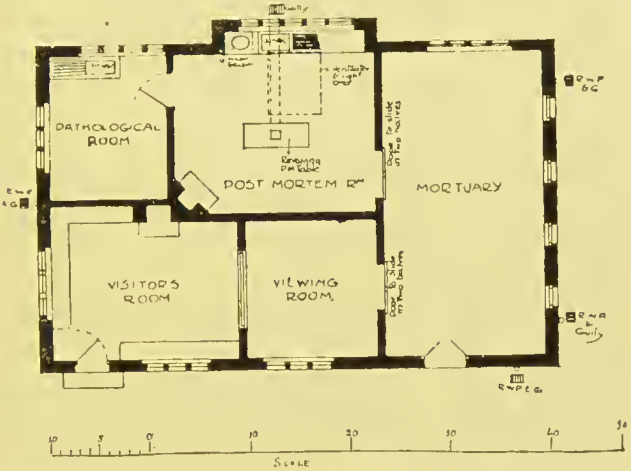
The laundry contains the following machines : steam power vertical engine, 9 horse-power ; two Lancashire boilers, each 20 ft. by 6 ft., with a Green's economizer, and a Lyon's disinfector. The patients' washhouse contains the following : injector washing machine, Vowel washing machine, two galvanized soap boilers, range of washing



LAUNDRY BLOCK.

troughs, two boiling pans, two rinsing tanks, hydro-extractor, eleven drying horses, and a foul washing machine. In the finishing room an ironing machine, box mangle, laundry stove, and airing horse are provided.

There is provided in the staff washhouse a washing machine, washing troughs, steam boiling trough, rinsing and blueing apparatus, hydro-extractor, starching apparatus, and seven drying horses. In the finishing room an ironing machine, body linen iron machine, shirt and collar ironer, laundry stove, and airing horse are provided. The foul washhouse is fitted with steeping tanks and sparging apparatus.



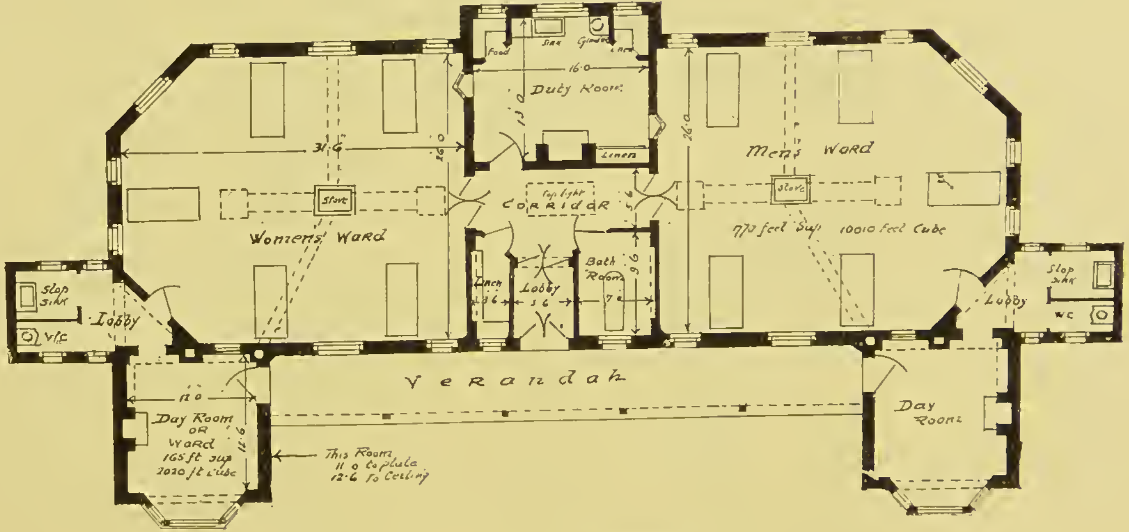
Plan of Mortuary, etc.

Refuse Destructor.—The destructor house, which is attached to the Southern Coal Depôt, is supplied with one of "Meldrum's" patent hospital type refuse destructors. The outside measurements of the furnace are 13 ft. by 5 ft., with an effective grate area of 7½ square ft. It is capable of burning from 3 to 4 cwt. per hour.

Mortuary.—The mortuary stands on the Lower Lane side of the site. It has the following accommodation: mortuary, post-mortem room, pathological room, visitors' room and viewing room.

Laboratory.—The laboratory building has a dispensing room, laboratory and office.

Medical Superintendent's Residence.—The medical superintendents' residence comprises the following: drawing and dining-rooms, study, kitchen, and other offices on the



SEDGEFIELD HOSPITAL.

Plan of Enteric and Scarlet Fever Pavilion.

J. H. Bottomley, Son & Wellburn, *Architects*, 1902.

ground floor. On the first floor there is provided four bedrooms, dressing-room, bath-room and lavatory; and on the attic floor two servants' bedrooms are provided.

Discharge Block.—The discharge block provides the following accommodation: undressing-room, bath-room, dressing-room, waiting-room, seamstress' room, water-closet, and lavatory. In the bath-room there are two baths, with a sliding screen between them.

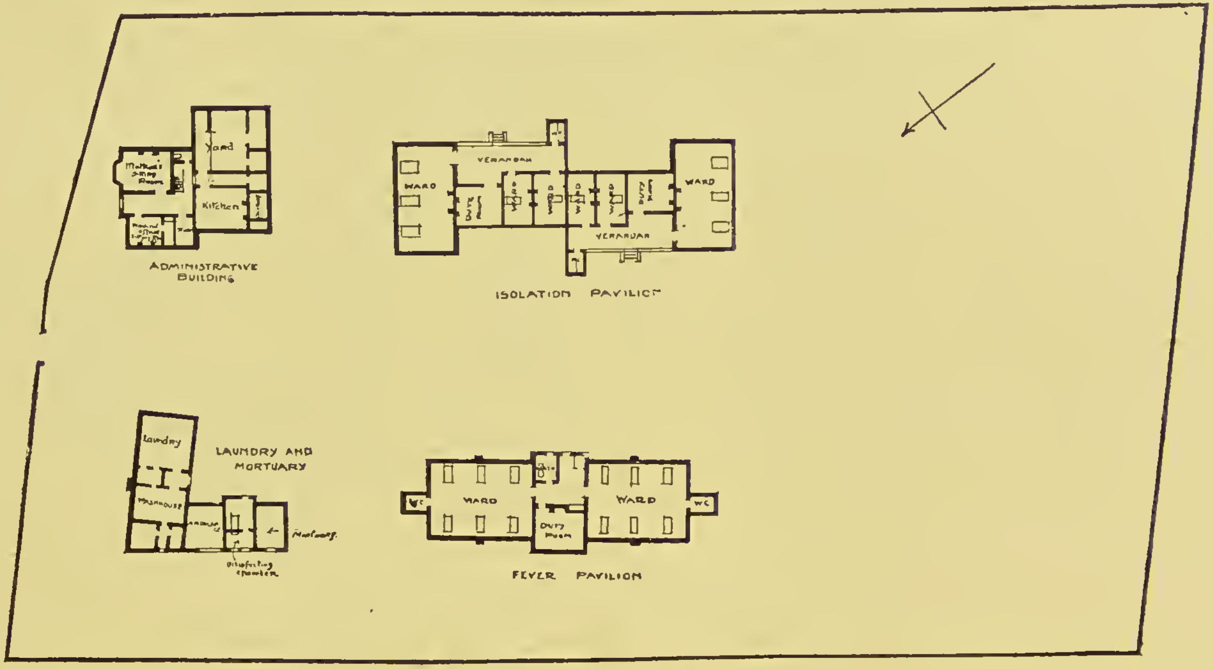
In conclusion, we will mention that this is an excellent example of a well-planned infectious disease hospital. It was erected from the design of the City Architect, Mr. Thomas Shelmerdine, and was formally opened on April 25, 1906, by Councillor Dr. John Otting, J.P., Chairman of the Port Sanitary and Hospital Committee. We are indebted for the plans and the general description of this hospital to a publication issued by the City of Liverpool Corporation, which contains much valuable information on infectious disease hospitals, contributed by Dr. E. W. Hope, M.D., Medical Officer of Health.

THE HEATHCOTE HOSPITAL, LEAMINGTON.

This hospital, which stands on a site occupying about 2 acres, has provision for twenty-two beds in two buildings, each completely isolated. It should be mentioned that this sanatorium is conspicuous by the absence of covered ways. One building contains two wards, each with accommodation for six beds, intended for patients suffering from one disease—one for males, the other females. A nurses' duty-room and bath-room are placed between the wards, the duty-room being so situated as to overlook the wards. Provision is made in these wards of 12 ft. wall space, 156 ft. floor space, and 2,028 cubic space.

The isolation pavilion has provision for eight beds, the building being divided by a wall in the centre for separating the male from the female patients. This building may therefore be called two pavilions, each of which contain one ward for three beds, and two wards for one bed each, in addition to duty room, space for movable bath, water-closet and a slop-sink. The wards in these pavilions have an allowance of 216 ft. floor space and 2,592 ft. cubic space.

The administrative building, which is two storey, is placed



THE HEATHCOTE HOSPITAL, LEAMINGTON.
KEITH D. YOUNG, *Architect.*

near the entrance. It contains, on the ground floor, matron and nurses' sitting-room, medical officer's room, kitchen, scullery, larder, etc., with bedrooms and bath-room for matron, nurses and servants on the first floor.

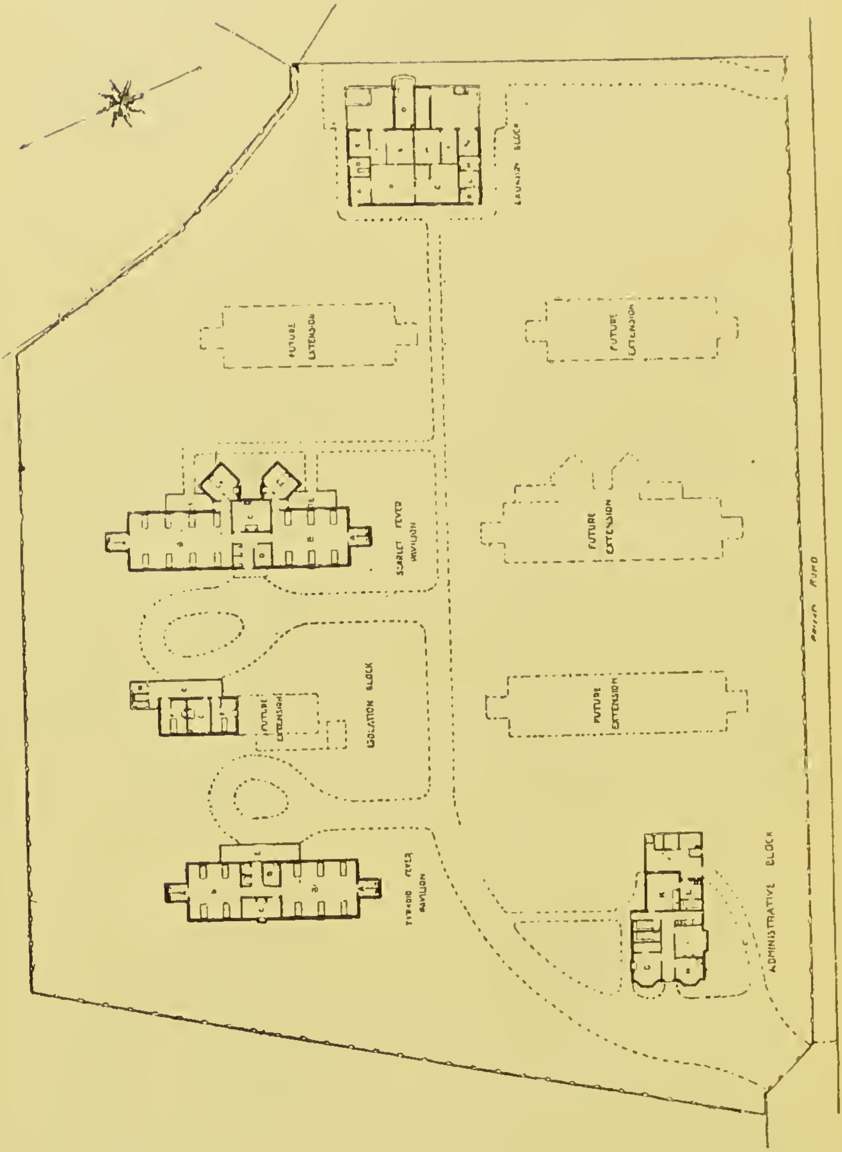
The laundry, disinfecting chamber and mortuary are arranged in one building near the entrance, on the opposite side of the principal roadway to that of the administrative building.

BOROUGH OF WEYMOUTH.

The isolation hospital of the Borough of Weymouth is situated outside the borough boundary, near Chickerell, in the Weymouth Rural District. It stands on an enclosed piece of ground 5½ acres in extent, and is constructed of galvanized iron, wood lined. This hospital comprises a central administration block and two detached ward blocks, connected by a covered corridor, with a central block, a laundry, and other buildings. Accommodation is provided for twenty patients in each pavilion. Two rooms in the administrative block have recently been converted into a ward for two beds, to be used for enteric or doubtful cases. During 1906, seventy-one cases only were admited into the hospital, and these may be classified as follows :—

Diphtheria	33
Scarlet fever	23
Enteric fever	3
Suspected diphtheria	2
,, scarlet fever	9
Mother with suckling infant suffering from diphtheria .	1

The permanent staff in this hospital consist of a matron, one probationer nurse, porter and wife—the latter acts as cook; a laundress is temporarily provided. Assistance in nursing is rendered, when required, from the Trained Nurses' Institute. It might be mentioned that during ten months of the year such assistance has been more or less required. The expenses of the hospital for 1906 were, for all purposes, £435 9*s*. The cost of maintenance alone of patients and staff is at the rate of 9¼*d*. and a fraction per head per day.



Crewe Sanatorium.
George E. Bolshaw, *Architect.*

Smallpox Hospital.

The smallpox hospital, which contains eight beds, adjoins the fever hospital. This building, which has not yet been required, is kept ready for patients.

BOROUGH SANATORIUM, CREWE.

This sanatorium was opened by the Earl of Crewe in 1897. It occupies a site of about 5 acres, and has accommodation for twenty-eight patients for the treatment of infectious disease. The buildings are divided into three blocks, with sixteen beds for scarlet fever, ten beds for typhoid fever, and two isolation wards for one bed each.

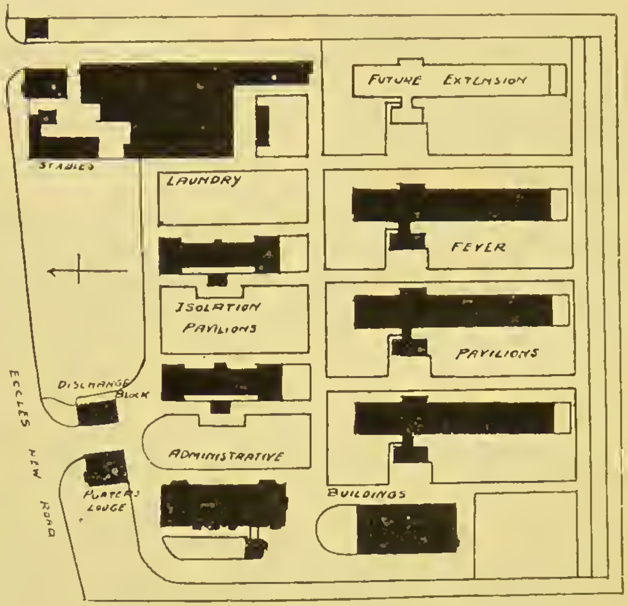
The administrative building provides accommodation for a matron and the nurses and staff. The buildings, which were erected from the design of Mr. George E. Bolshaw, Architect, cost about £7,000.

LADYWELL SANATORIUM, SALFORD.

The Ladywell Sanatorium, Salford, has accommodation for 184 beds. This hospital stands on a site of about 7⅓ acres, which is equivalent to twenty-five beds per acre. Provision is made for a future pavilion to hold forty-eight beds; when this is erected the site will give thirty-two beds per acre.

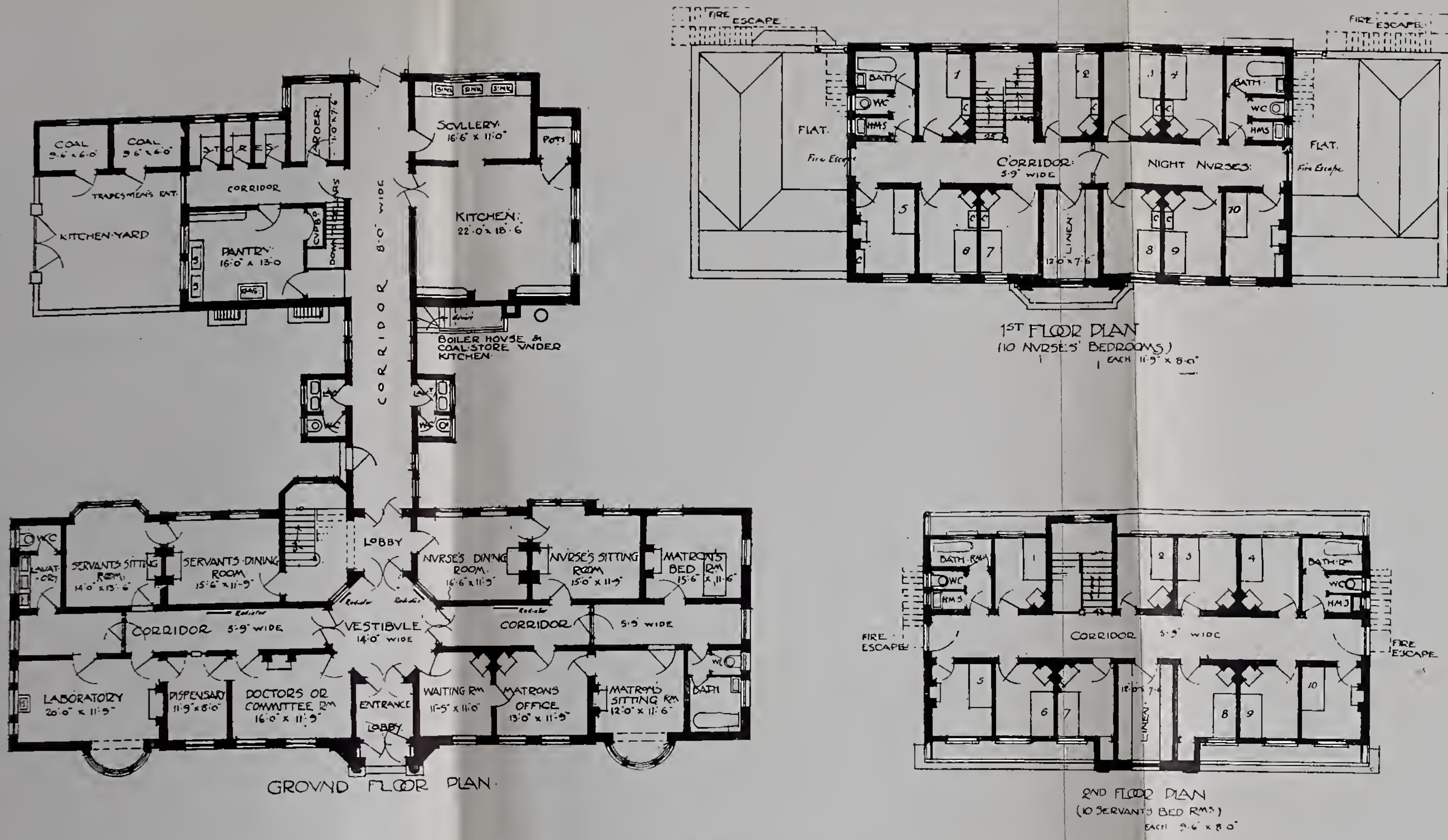
There are at present three two-storey pavilions, each floor containing an acute ward for six beds and a convalescent ward for eighteen beds. In the centre, overlooking both wards, is a nurses' duty-room, in addition to a bath-room. The staircase leading to the first floor is entirely disconnected from the ground floor. Provision is made of 169 ft. floor space and 2,197 ft. cubic space per bed. The water-closets and slop-sinks are placed opposite the staircase, and separated from the main pavilion by a corridor 12 ft. long.

Two pavilions, each two storeys high, are provided for doubtful cases, and for paying patients. There are four wards of two beds each, and five wards of three beds, together with four duty-rooms, and water-closets. With this arrangement of plan four different diseases may be treated at the same time. The staircase leading to the upper floor is so situated that the nurse in charge of the upper floor has no communication with the lower wards. A verandah on the west side of the pavilion forms a covered communication between the several rooms, and the inconvenience generally met with by the ward opening directly into the open air, is in this case overcome by reducing the size of the duty-rooms and thus forming lobbies, from which the wards are entered. Provision is also made of stables, men's quarters, ambulance sheds and laundry, having distinct washhouses for the patients and staff, disinfecting chambers; also mortuary, discharge ward, stores, kitchen quarters and medical superintendent's and matron's quarters.



The Ladywell Sanatorium, Salford.
Maxwell & Tuke, and E. & F. Hewitt, *Joint Architects.*

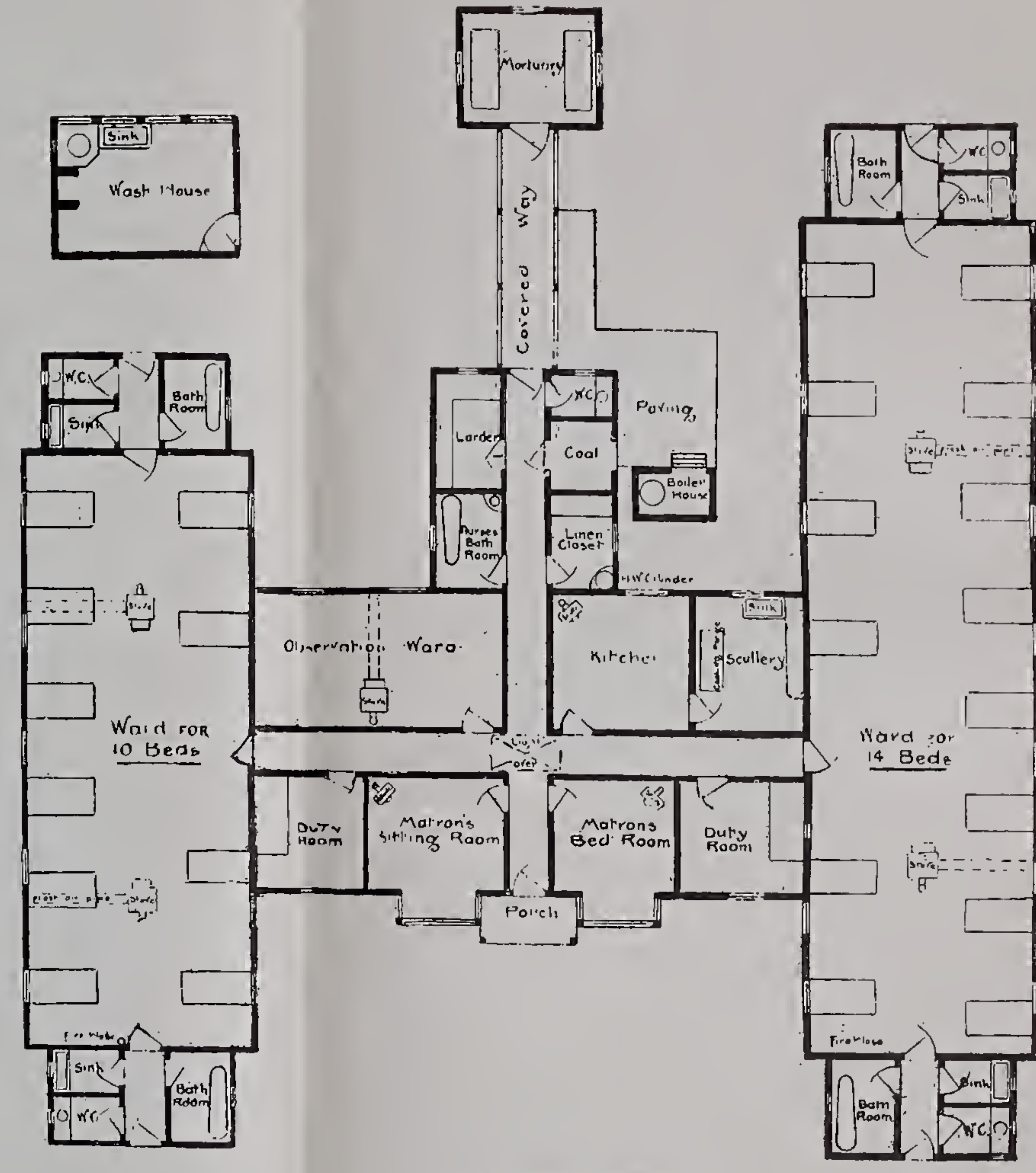
Provision is also made here of a sanitary department for the disinfection of carpets, draperies, etc., from all infected houses in the borough.



BURY FEVER HOSPITAL.

ADMINISTRATIVE BLOCK.

POOLE & LITTLE, *Architects.*



PLAN OF BILSTON HOSPITAL,

J. P. WAKEFIELD, A.M.I.C.E., *Engineer.*

[*To face page* 93.

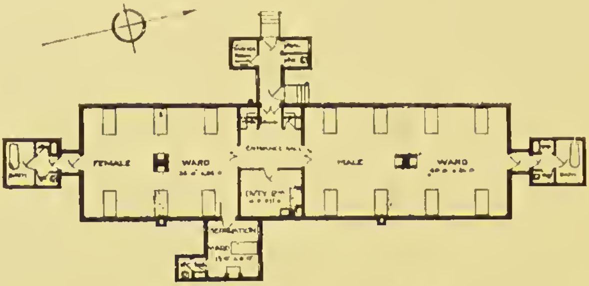
BOROUGH OF MACCLESFIELD.

The Medical Officer of Health, in his report of 1906, states that this authority reserves four beds in their hospital, but scant use of the accommodation provided is made use of, only five cases being sent in from the Rural District during the year. The County Council have required the Urban District Council of Bellington to provide beds for scarlet fever patients, and they have entered into an agreement to reserve four beds for use in the hospital. In addition, the Macclesfield Rural District Council have been further required to provide accommodation for fourteen patients, and they have entered into an agreement with this Corporation to receive and treat that number of cases if necessary. To meet the extended accommodation plans have been prepared for the erection of a single-storey brick structure to accommodate sixteen beds in two separate divisions of eight beds each; the eight beds being subdivided into two wards, one of five and one of three beds. When this new block is completed there will be provision for forty beds and five children's cots for general infectious disease and twelve beds for smallpox, the latter being situated in a separate block, a quarter of a mile away from the general isolation hospital and having separate nurses' home, washhouse, etc.

BURY INFECTIOUS DISEASE HOSPITAL.

The Bury Infectious Disease Hospital, which cost about £14,000, was erected from the design of Messrs. Poole & Little, Architects, London. The whole of the buildings are placed on the site facing east and west. The administrative building, which is located somewhat ingeniously behind the entrance lodge, which has infected and disinfected entrance (one on either side), comprises two buildings connected at the ground-floor level with a covered corridor.

The front building provides the following accommodation: waiting-room, matron's office, sitting and bedroom, nurses' sitting-room, nurses' dining-room, servants' dining-room and sitting-room, doctor's room, dispensary, laboratory and the usual offices. On the first floor of the building ten bedrooms for nurses, each 11 ft. 9 in. by 8 ft., are provided; also linen store, two bath-rooms and the usual offices. On the second floor ten servants' bedrooms are provided, each about 9 ft. 6 in. by 8 ft., with the usual offices as provided on the first floor.

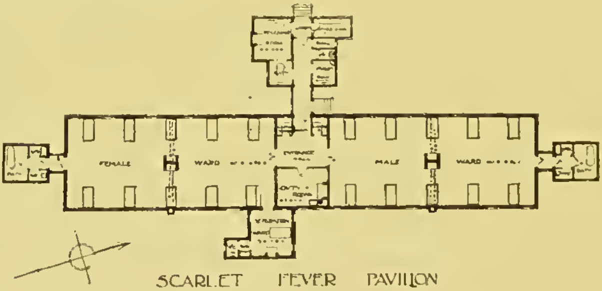


TYPHOID FEVER PAVILION

The kitchen buildings, which stand at the rear of the administrative block, comprise the following: kitchen 22 ft. by 13 ft. 6 in., scullery 16 ft. 6 in. by 11 ft., pantry 16 ft. by 13 ft., larder, stores, etc.

Scarlet Fever Pavilion.—This pavilion provides accommodation for twenty-one beds. It has two wards each for ten beds, one for male and one for female patients, the two being divided by a duty room which has inspection windows overlooking all wards. Leading off the female ward is a one-bed separation ward.

At the front of this block is provided a small building, connected with the ward pavilion by a covered corridor, containing a receiving-room, clothes store, nurses' room, coals and water-closet.

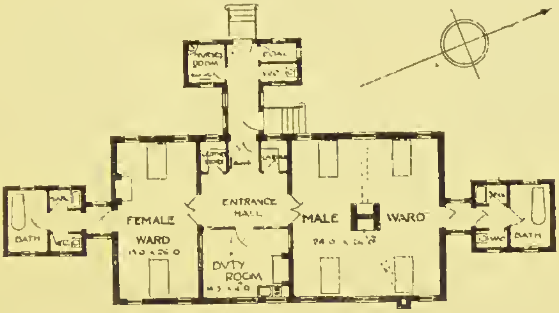


SCARLET FEVER PAVILION

Typhoid Pavilion.—The typhoid pavilion comprises one ward for three beds, size 36 ft. by 26 ft.; one for eight beds, size 48 ft. by 26 ft., and one separation ward for one bed, leading off the female ward, size 15 ft. by 12 ft.

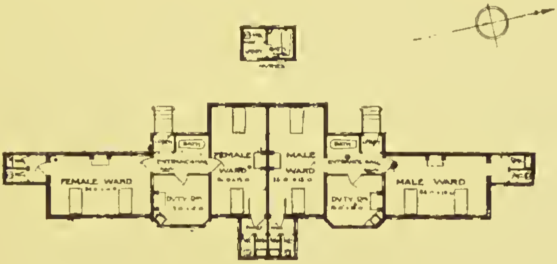
A duty room separates the two large wards and is so situated as to command a view of the three wards from inspection windows. In the front of this pavilion, disconnected from the entrance hall by a small lobby is a nurses' wardrobe room, coals and water-closet.

Diphtheria Pavilion.—This pavilion provides accommodation for six patients ; as will be seen from the accompanying illustrations it is planned on the same lines as the last building.



DIPHTHERIA PAVILION.

Isolation Pavilion.—This pavilion is divided into two separate blocks ; each portion contains two two-bed wards, one size 24 ft. by 14 ft., and the other size 26 ft. by 13 ft.

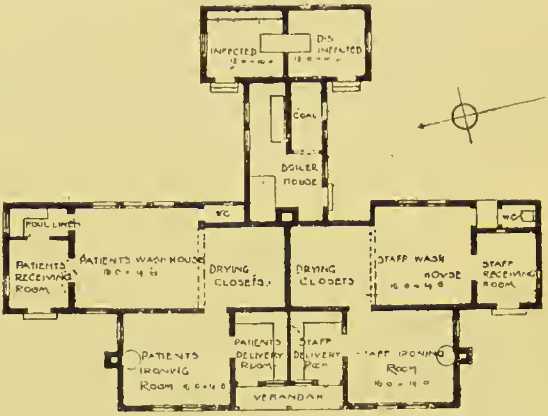


ISOLATION PAVILION.

Separating the two and with access from the entrance hall is a duty room which commands a view, from inspection windows, of each ward.

Adjoining this block, but somewhat isolated, is a small building comprising a nurses' bath-room and water-closet.

Laundry.—This building provides accommodation for the washing of patients' and staff clothing in separate apartments. The patients' laundry comprises a general washhouse, size 19 ft. by 14 ft. 6 in., ironing room 16 ft. by 14 ft., drying closets, receiving and delivery rooms. The staff department consists of a washhouse, size 15 ft. by 14 ft. 6 in., ironing room, size 16 ft. by 14 ft., and receiving and delivery room. In addition there is provided disinfecting chambers, boiler-house, coal stores, etc.



Plan of Laundry.

CHORLEY HOSPITAL.

The Chorley Hospital was erected in 1901, from the design of Messrs. Jolly & Buckley, Chorley, at a cost of about £17,000. This hospital consists of five blocks of buildings: the administrative block; diphtheria block; typhoid fever block; scarlet fever block; and the working buildings. The administrative buildings stand to the right of the entrance. From the entrance hall is entered awaiting-room for patients, and matron's sitting-room and a sitting-room for the nurses; doctor's dispensary and sitting-room and the usual kitchen accommodation.

Telephone communication is so provided that from this building the matron can communicate with and receive communications from all parts of the district and the nurses' rooms in the various pavilions. On the floor of the administrative block, provision is made of eight bedrooms for the nurses and probationers, and the matron's bedroom, a bath-room, linen store and usual offices complete the accommodation. On the second floor are bedrooms for the domestic servants. Each of the fever pavilions have a glass-covered verandah, leading from the roadway to the entrance to the respective buildings.

The diphtheria has two wards, each with accommodation for four beds, and two wards, each with two beds for miscellaneous and undiagnosed cases.

The scarlet fever pavilion contains two wards each with accommodation for six beds, one for males and the other for females. In the scarlet fever pavilion provision is made for the immediate ejection from the building of all soiled linen intended for the disinfector.

The laundry block contains disinfecting chambers, laundry, mortuary, stables and ambulance house.

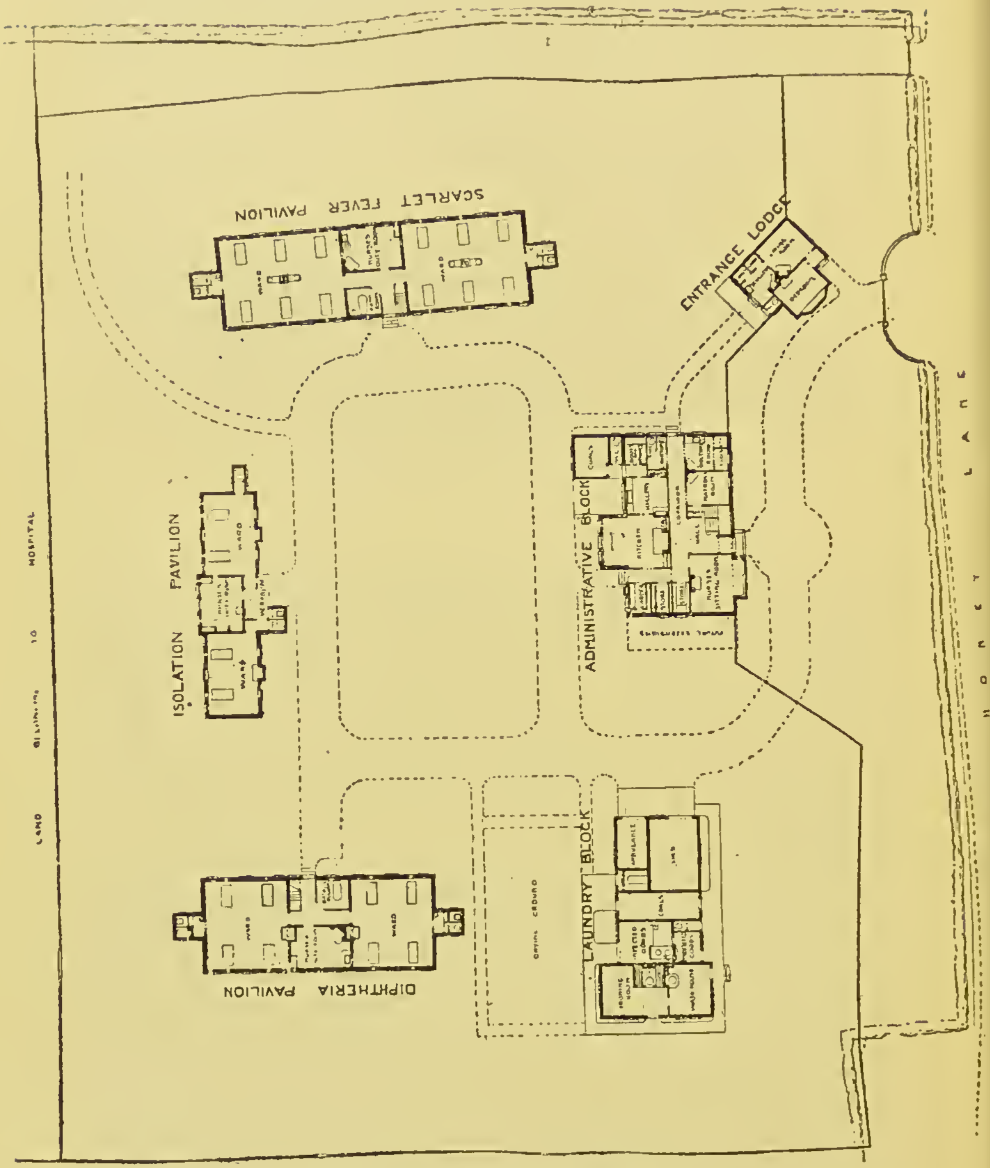
WALTHAM JOINT ISOLATION HOSPITAL.

This isolation hospital was erected in 1906, at Waltham Abbey, for the joint use of the Urban Districts of Buckhurst Hill, Chingford and Waltham Holy Cross. This hospital cost £7,100, or about £291 per bed. It comprises entrance lodge, administrative building, isolation pavilion, diphtheria pavilion, scarlet fever pavilion, laundry and mortuary.

The lodge, which is situated next the entrance gates, provides accommodation for a caretaker and his wife. It comprises a living-room, bedroom, scullery and the usual offices.

The administrative building provides the following accommodation on the ground floor: matron's sitting-room, nurses' sitting-room, doctor's room, kitchen, scullery, stores and the usual offices. On the first floor there are eight bedrooms, bath-room, linen stores, etc.

The isolation pavilion, which is situated on the north of the site, consists of two two-bed wards with a nurses' duty-room dividing the same. At the front of this building is a small verandah in which stands a movable bath. Each of the wards are entered from the verandah, so as to completely isolate each of them.



WALTHAM JOINT HOSPITAL.
WALTER STAIR, M.S.A., HERBERT TOOLEY, A.R.I.B.A., *Joint Architects.*

The diphtheria pavilion, which is situated on the west side of the site, consists of two wards, each for four beds, nurses' duty room, bath-room and the usual offices on the ground floor, while over the nurses' duty room is a linen store and cistern room. This block follows the general principles of plan adopted throughout the country. The scarlet fever pavilion is situated to the west of the site, facing the diphtheria pavilion. It is similar in plan to the last but with six beds in each ward, and has, in addition, a large room provided on the first floor for convalescent patients. Considering that the entrance to the first floor room for convalescents is not entirely isolated from the scarlet fever wards it is not entirely to be recommended.

The laundry comprises washhouse, ironing room, ambulance station and rooms for infected and disinfected goods.

The architects were Mr. Walter Stair, M.S.A., of Chingford, and Mr. Herbert Tooley, A.R.I.B.A., Surveyor to the Buckhurst Hill Urban District Council.

BILSTON HOSPITAL.

The fever hospital at Bilston was erected, in 1906, by the Urban District Council. The building is an iron and timber structure, lined with matchboards. There are two wards providing accommodation for fourteen and ten beds respectively. In the centre, dividing the two wards, is the administrative portion, in which is provided an observation ward for doubtful cases, which can also be used as a day-room for convalescent patients, a doctor's room, nurses' sitting and bedrooms, bath-room, kitchen, scullery, linen store, etc. At the rear is a washhouse and a mortuary. The hospital is lighted throughout by electricity.

The buildings were erected under the direction of Mr. J. P. Wakeford, A.M.I.C.E., Engineer and Surveyor to the Council, and cost about £2,600 or £108 per bed, exclusive of the cost of the land. Assuming that the cost of the land is borne by the hospital, then, the expenditure will amount to £3,000 or £125 per bed.

NANTWICH HOSPITAL.

This hospital, which is situated on the Middlewich main road, was built by the Urban and Rural District Councils of Nantwich, in 1907. It consists of three ward pavilions, laundry and administrative building, and provides accommodation for twenty patients. The discharge block is placed at the end of the laundry building. The mortuary is on the north side, and the ambulance and van-house, together with the disinfecting station and boiler-house adjoin the laundry.

The administration building contains on the ground floor matron's sitting-room, doctor's room, nurses' dining-room, kitchen, scullery, pantry and lavatory, etc. On the first floor six bedrooms and bath-room are provided, and on the second floor five bedrooms and the usual offices.

The two main ward pavilions each contain two four-bed wards, ward kitchen, bath-room, linen store and the usual offices. The isolation pavilion contains two wards, ward kitchen and nurses' duty-room. The wards are heated by central hospital stoves and are ventilated by Sherringham inlets and Boyle's air-pump ventilators. All the wards and kitchens have tiled dadoes to the walls and are finished above with Keene's cement. The floors are of pitch-pine and are wax-polished. The floors of the passages and kitchens are paved with terrazzo marble mosaic.

This hospital, which was erected from the design of Mr. C. E. Davenport, Architect, Nantwich, cost about £8,500.

SMETHWICK HOSPITAL.

The Holly Lane Smethwick Isolation Hospital, erected jointly by the Smethwick Town Council and Olbury District Council, at a cost of about £20,000, was opened in September, 1907. Only a portion of the original scheme has been completed, this including the erection of the observation block, administrative buildings, discharging block and the pavilion for sixteen beds. An old pavilion, formerly used for smallpox purposes, has been altered so as to provide for twelve beds. When the hospital is completed there will be sixty-eight beds in the institution. The architect was Mr. C. J. Fox-Allen.

BURNLEY DISTRICT FEVER SANATORIUM.

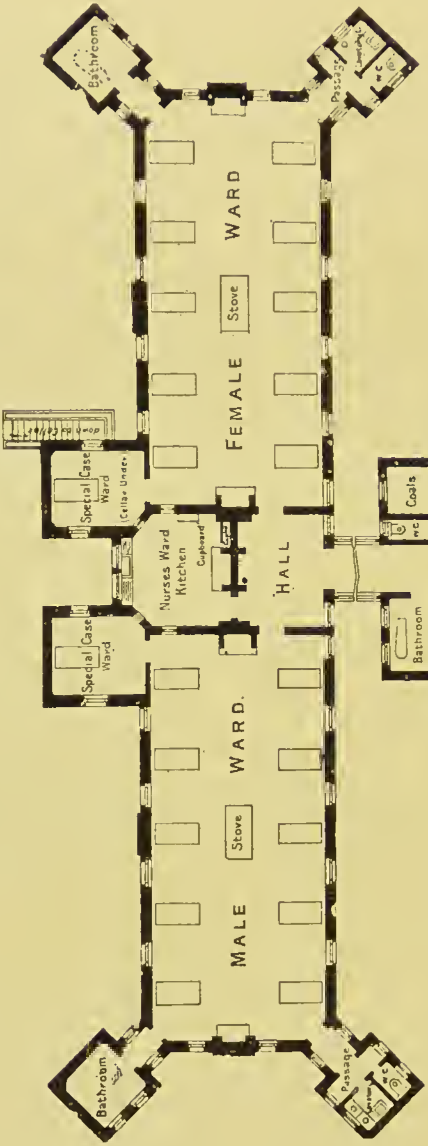
The want of an isolation hospital was first fully appreciated in 1886, when by a Provisional Order, dated April 28, 1886, a joint board was formed for the purposes of the "provision, maintenance, and management, for the use of the inhabitants of the constituent districts of a hospital or hospitals for the reception of cases of infectious diseases." The following Authorities constituted the Board: Burnley Rural Sanitary Authority, Brierfield Local Board, Corporation of Nelson, and Padiham Local Board. The Corporation of Burnley was approached with the object of joining the Board; the result was that the old Board was dissolved, and a new Board constituted, termed the Burnley Joint Hospital Board. This was formed under power granted by a Provisional Order confirmed by the Local Government Board's Provisional Orders Confirmation (No. 18) Act, 1894.

The cost of the maintenance of patients is paid by the several constituent Authorities, from whose districts the patients respectively are received into the hospital, and such cost includes all the expenses incurred in and about the maintenance and care of the patients in the hospital, and in and about their medical treatment, except so far as the same is included in the salary of the Medical Officer, and in and about the clothing, conveyance to and from the hospital, and burial and funerals of patients, and also includes the remuneration and rations of the nurses.

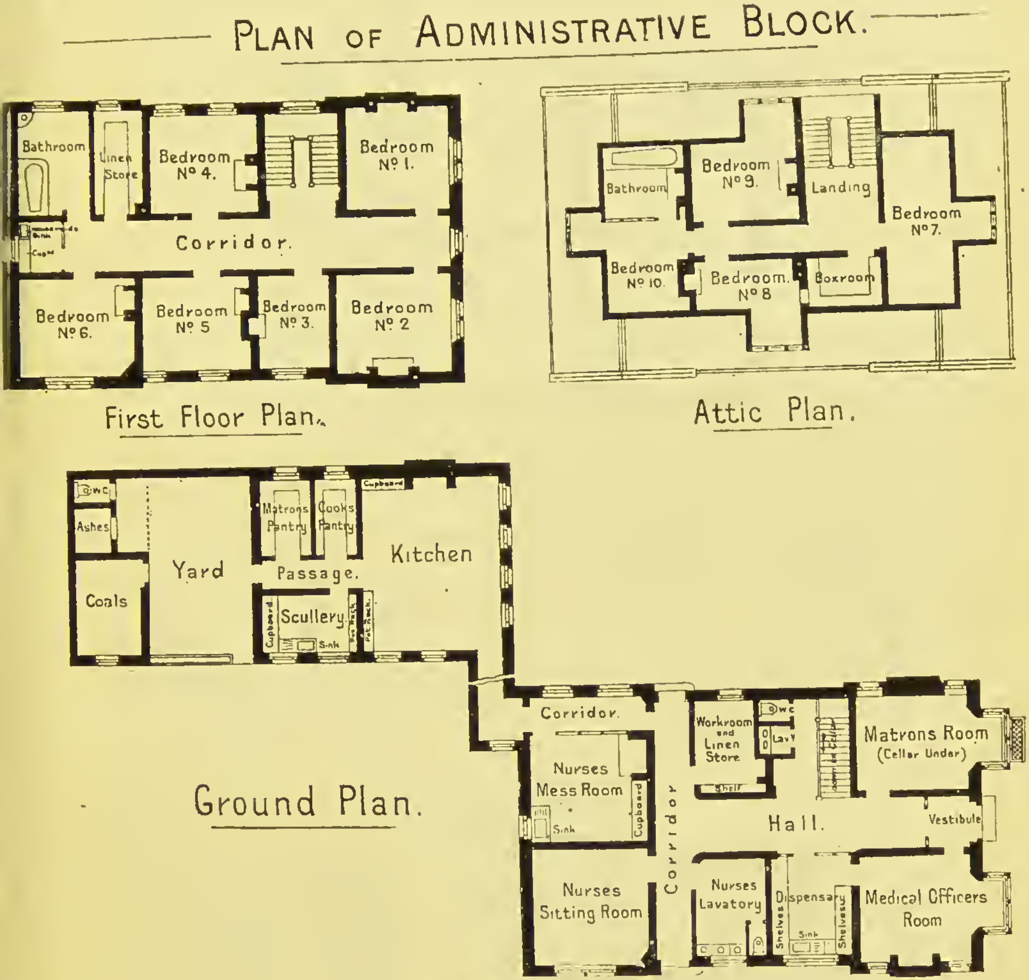
The site of this hospital contains 22½ acres, and was purchased for £2,250. It is situated on rising ground within the county borough of Burnley. The height of the land above the sea level varies from 600 ft. to 750 ft.

The aspect of the site is south-westerly, and the subsoil somewhat heavy, consisting of soil and clay overlaying shale and rock. The portion of the site which has already been appropriated for hospital purposes contains 6¾ acres, on which there is space to erect, in addition to the buildings completed, four more pavilions, which will provide, together

BURNLEY HOSPITAL.



PLAN OF PAVILIONS.

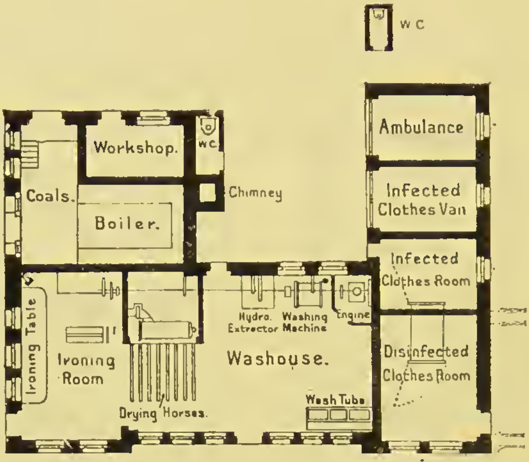


BURNLEY HOSPITAL.

F. S. BUTTON, A.M.INST.C.E., *Architect.*

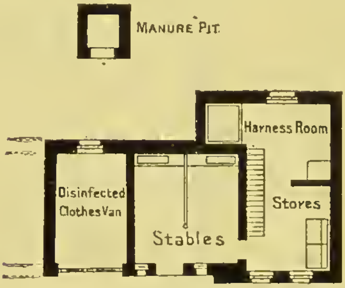
with the present accommodation, for at least 104 adult patients. The administration block is so arranged as to allow of extensions being easily made when necessary.

The administration block contains Medical Officer's room and dispensary, matron's room, nurses' mess room and sitting-room, workroom and linen stores, kitchen, scullery, and pantries; also ten bedrooms, two bath-rooms, and lavatories.

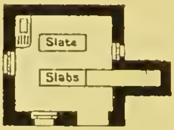


— LAUNDRY. —

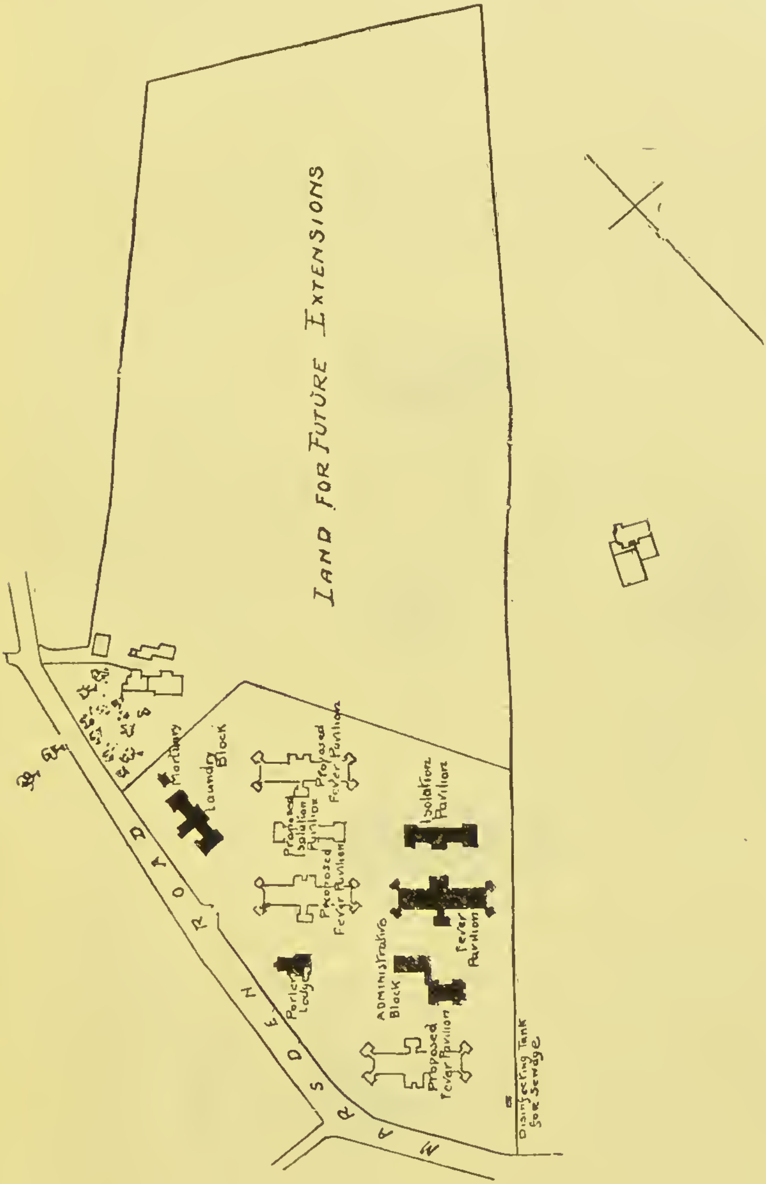
The fever pavilion has accommodation for twenty-two adult patients, in two wards of ten beds each and two single bed wards. The nurses' ward kitchen is fitted with inspection windows to each ward. At the entrance to the pavilion



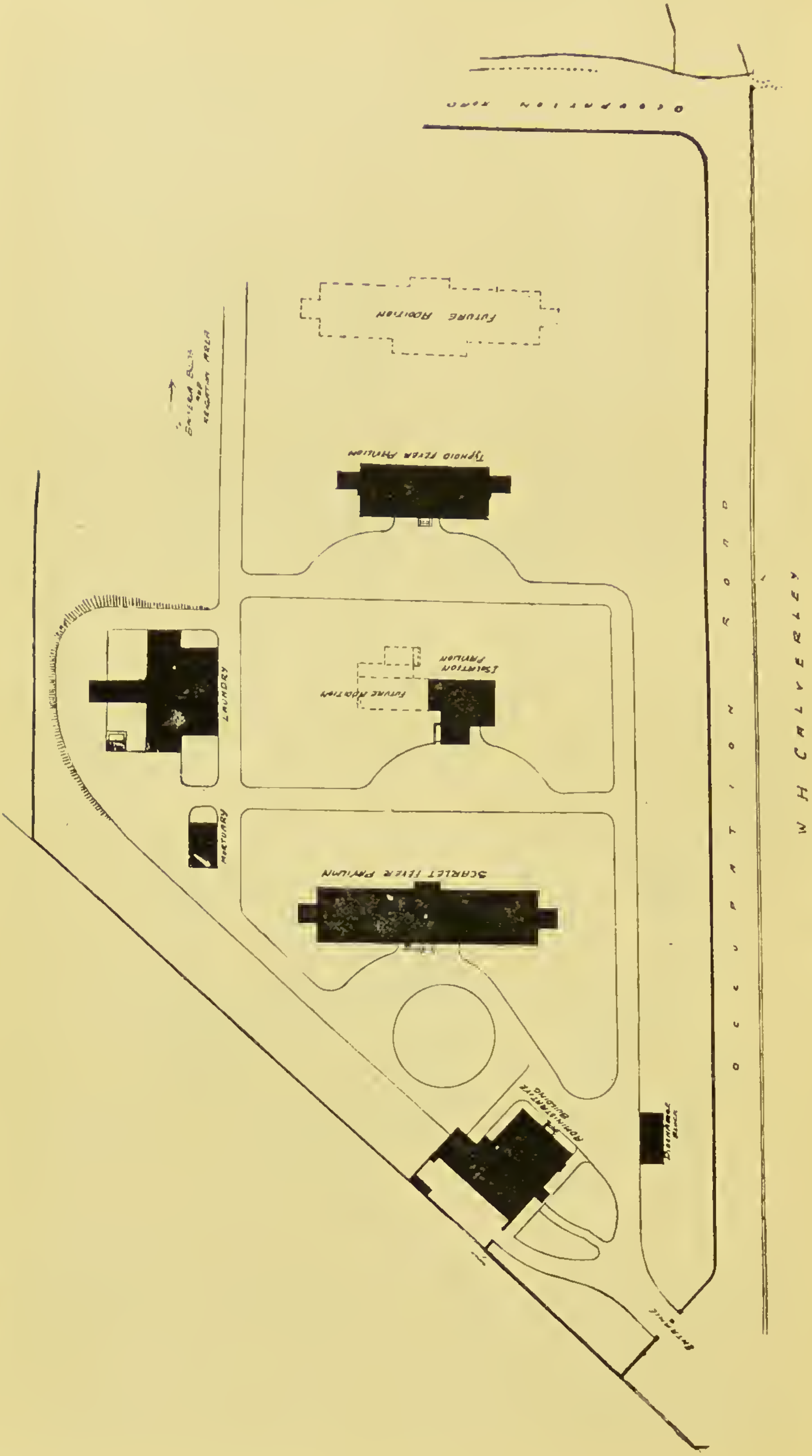
— STABLES —



- MORTUARY -



BURNLEY HOSPITAL.
PLAN OF SITE.
F. S. BUTTON, A.M.INST.C.E., *Architect.*



OAKWELL JOINT HOSPITAL BOARD, FOX-HALL, BIRSTALL.
JOHN W. BURROWS, *Architect.*

there is a small discharging block, containing bath-room, dressing-room, and stores.

The isolation pavilion contains four wards of two beds each and two ward kitchens, the usual inspection windows being provided between the wards and kitchens. The general construction and fitting up of this block is similar to the fever pavilion.

The laundry, stable, and mortuary block comprises boiler-house, workshop, washhouse, and ironing room, disinfecting rooms, ambulance sheds, sheds for infected and disinfected clothes vans, two stalled stables, harness room and isolated mortuary. The mortuary is lined with glazed bricks, and has two slabs, one of which has a continuation slab, along which a body may be placed so as to be under a special inspection window. This is an excellent provision for friends of a deceased to see the body from the exterior, with the minimum of risk of infection.

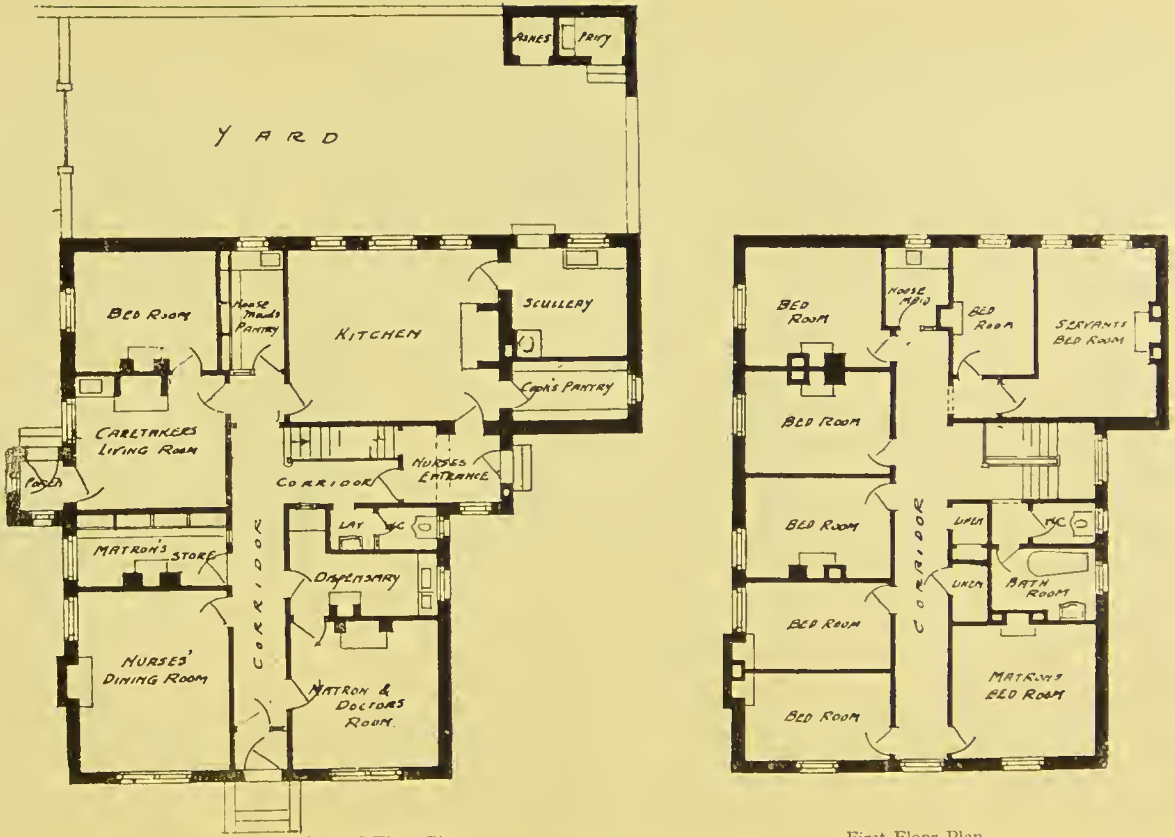
The first portion of this hospital, which was erected from the design of the late Borough Engineer, Mr. F. S. Button, A.M.Inst.C.E., cost about £20,000, which includes the cost of land, buildings, drainage, road-making and furnishing.

Two additional pavilions have recently been erected, each for twenty-two beds, a new administrative block with twenty-two bedrooms, in addition to mess-rooms and sitting-rooms for the staff. Provision is now made for seventy-four beds. The total cost of the hospital, including boundary walls, drainage, roads and furnishing was about £36,000. The average cost per bed, exclusive of the site, £486.

OAKWELL HOSPITAL.

This hospital is erected upon a site known as Foxhall Farm, and comprises about 8 acres. It stands at a high altitude to the left of the Great Northern Railway, between the Howden Clough and Drighlington stations. The hospital comprises administrative block, scarlet fever pavilion, typhoid fever pavilion, isolation pavilion, laundry, mortuary and discharge block.

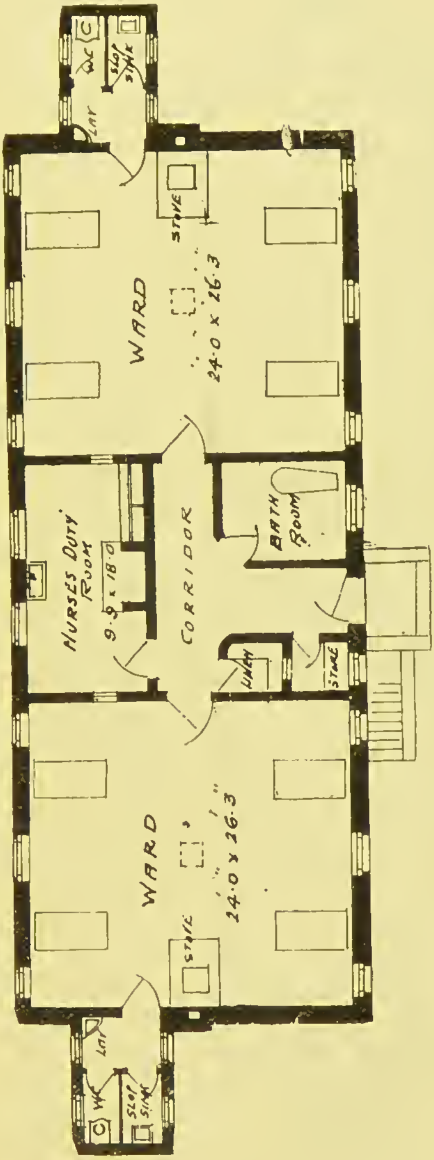
On the ground floor of the administrative block provision is made of matron's and doctor's rooms, dispensary, matron's store, nurses' dining and sitting-room, kitchen, scullery,



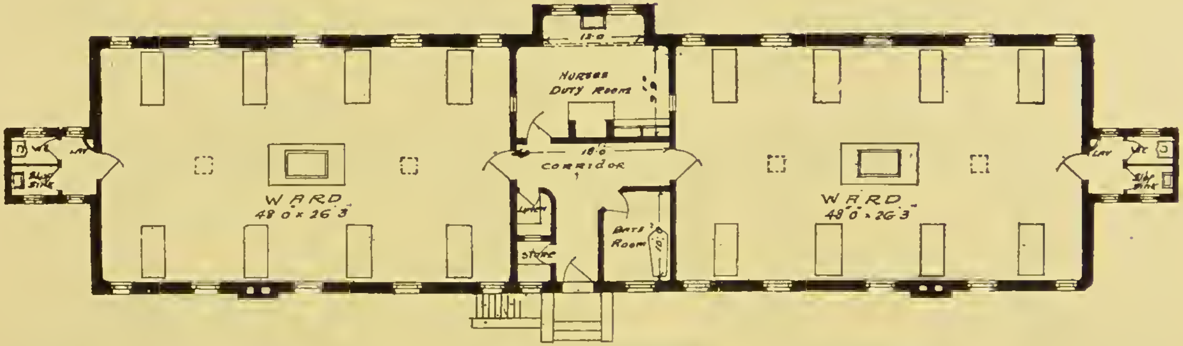
Ground Floor Plan.　　First Floor Plan.

Oakwell Joint Hospital Board, Fox-Hall, Birstall. Administrative Building.

John W. Burrows, *Architect.*

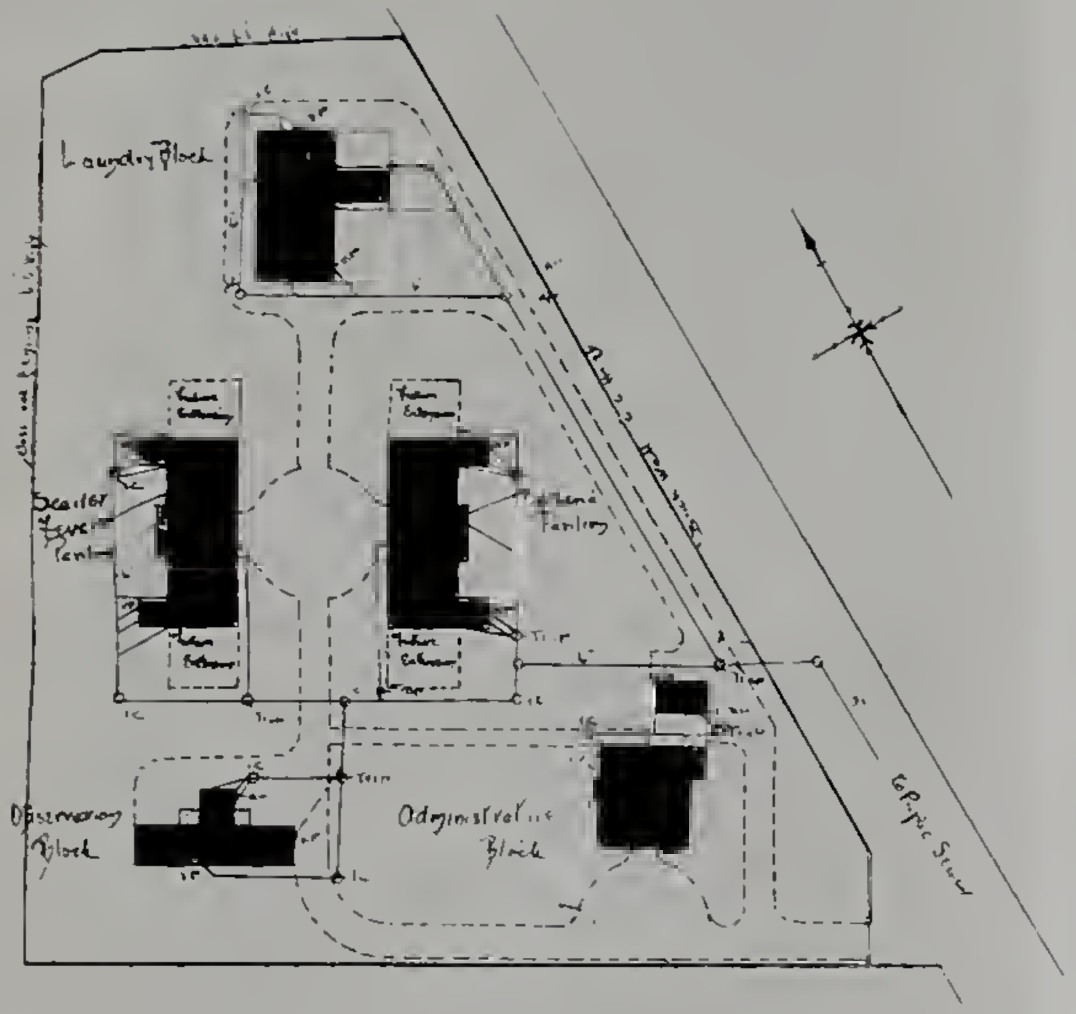


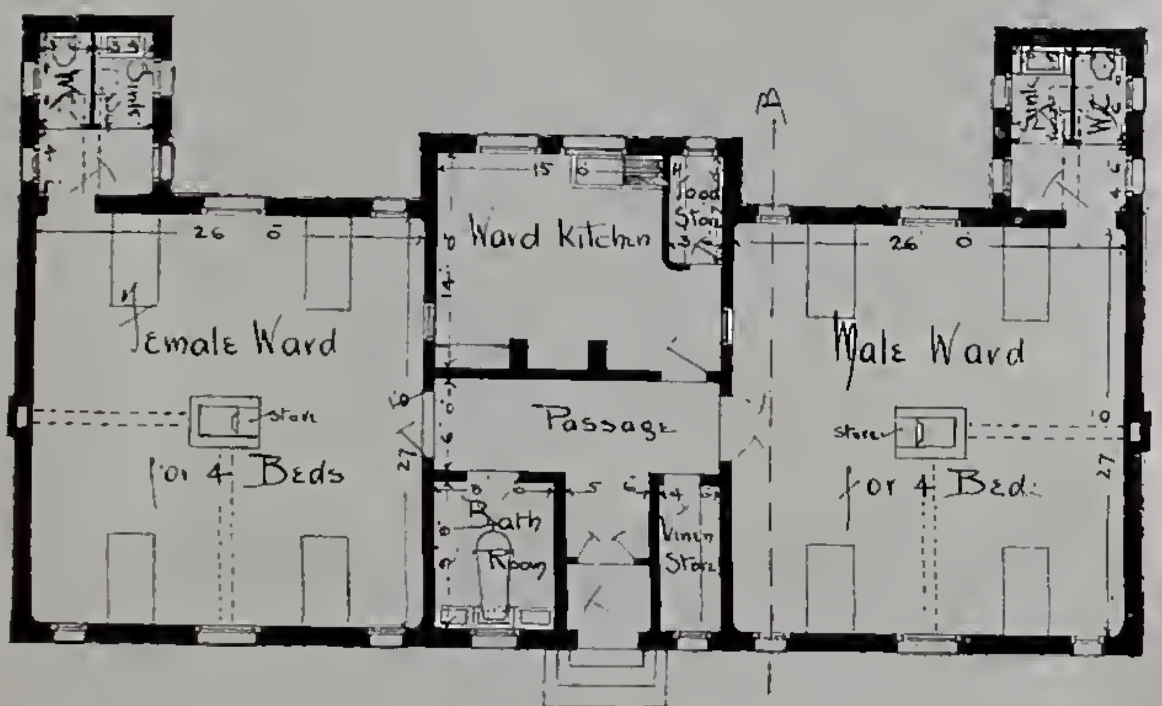
Oakwell Joint Hospital Board, Fox-Hall, Birstall.
Typhoid Pavilion.
John W. Burrows, *Architect.*



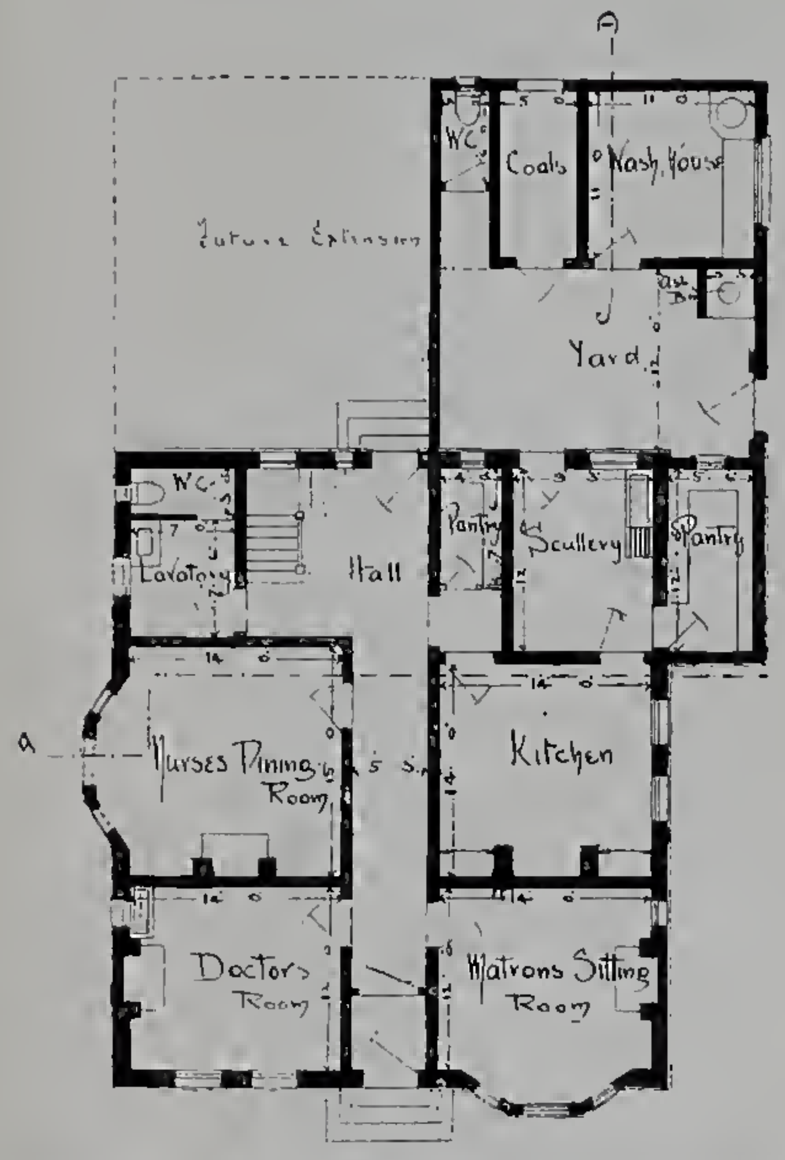
OAKWELL JOINT HOSPITAL BOARD, FOX-HALL, BIRSTALL.
SCARLET FEVER PAVILION.
JOHN W. BURROWS, *Architect.*

NANTWICH HOSPITAL.

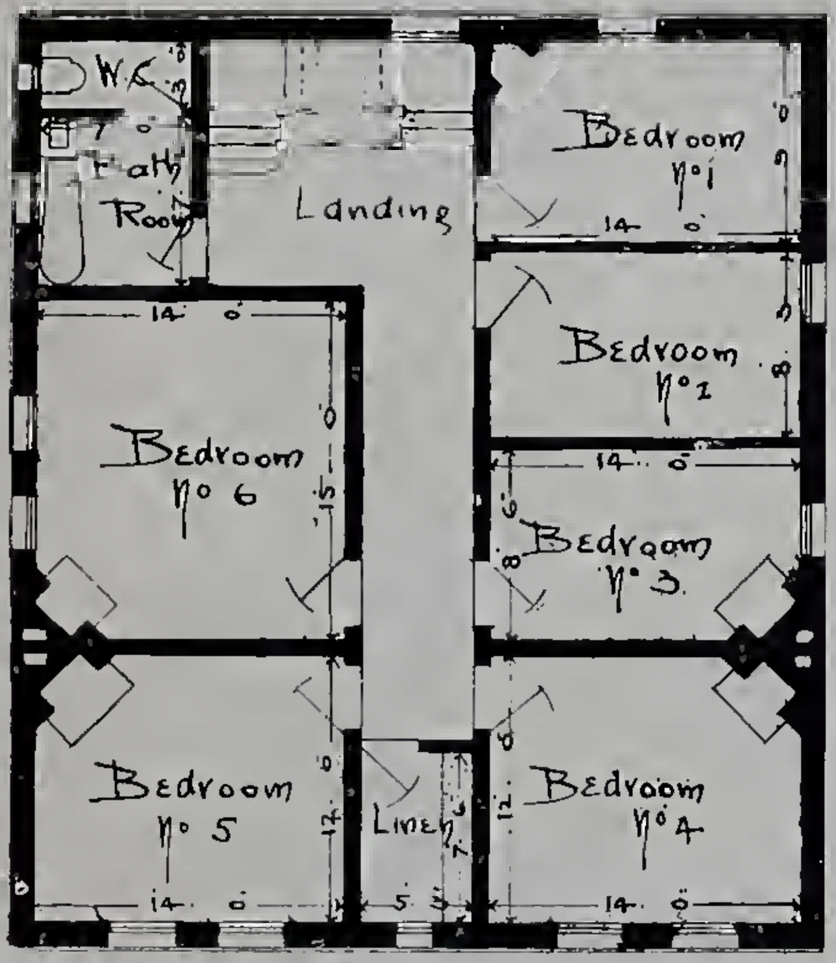




PLAN OF SCARLET AND DIPHTHERIA PAVILIONS.

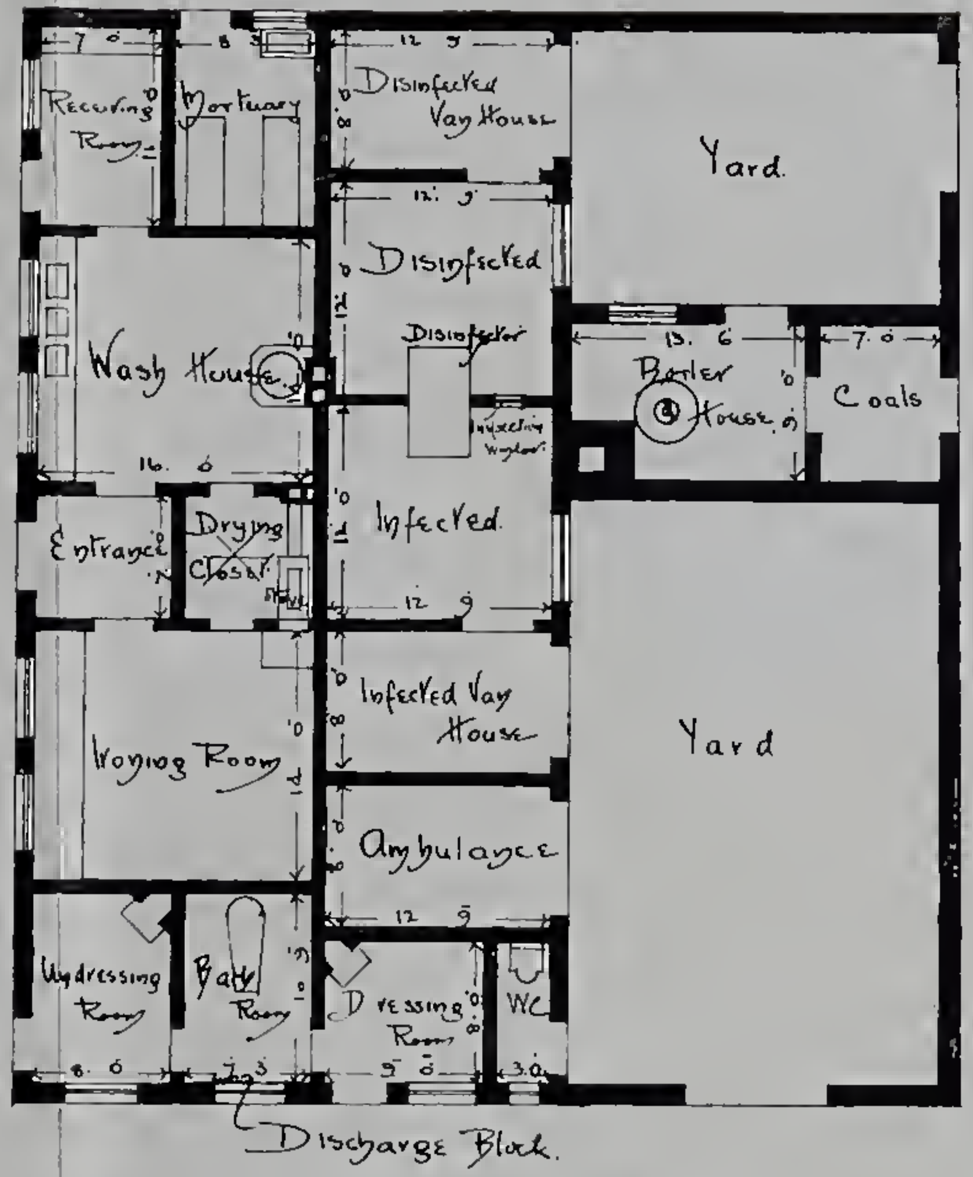


GROUND PLAN, ADMINISTRATIVE BUILDINGS.



FIRST FLOOR PLAN, ADMINISTRATIVE BLOCK.

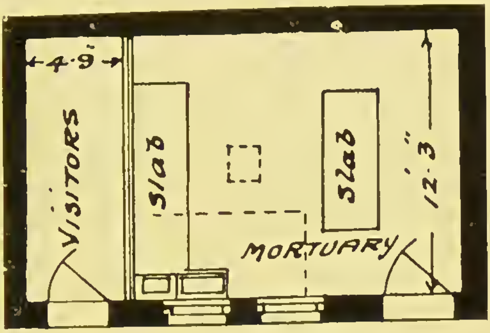
C. E. DEVONPORT, M.S.A., *Architect.*



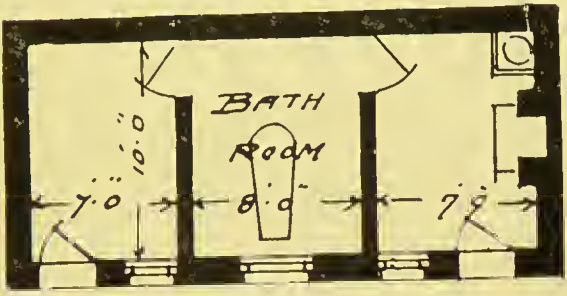
LAUNDRY AND DISCHARGE BLOCK.

[*To face page* 100.

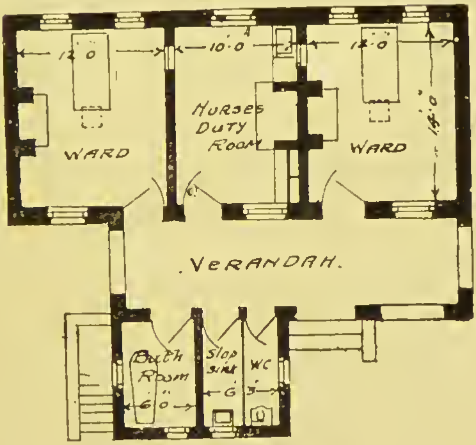
housemaid's pantry, cook's pantry, caretaker's living-room (with separate entrance porch), caretaker's bedroom. Separate entrances are provided for the nurses and tradesmen. On the first floor the following accommodation is provided :



MORTUARY.



DISCHARGE BLOCK.



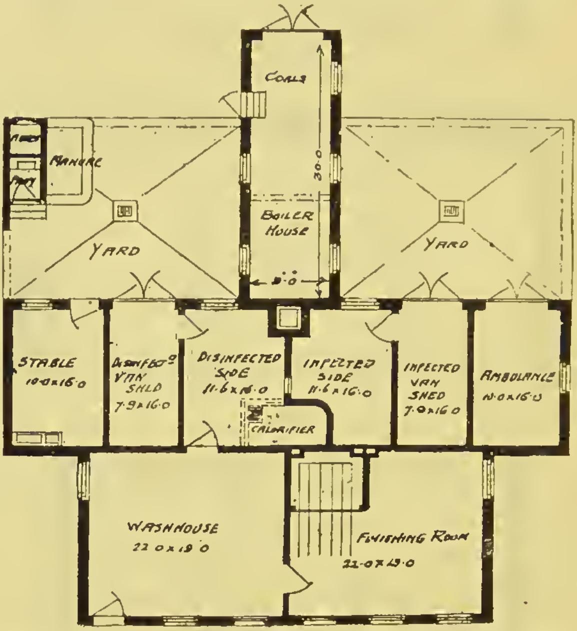
ISOLATION PAVILION.

matron's, nurses' and servants' bedrooms, two linen stores, bath-rooms, etc.

The pavilions for scarlet fever, typhoid fever, and for isolation cases are one-storeyed buildings, each containing two wards and other adjuncts.

The laundry building contains a washhouse, finishing and ironing room, boiler-house, stable, ambulance house, infected and disinfected van sheds, two washing yards. A steam disinfector is provided with a calorifier in the basement.

The mortuary contains two slabs, and adjoining is a visitors' lobby, separated from the mortuary by an air-tight glazed screen. The visitors' lobby is reached by a separate external door. The discharge block, which is situated near the entrance, contains undressing and dressing-rooms and bathing-rooms. This hospital was erected from the design of Mr. J. W. Burrows, of Birstall and Mirfield, in 1901.



OAKWELL JOINT HOSPITAL BOARD, FOX-HALL, BIRSTALL.
JOHN W. BURROWS, *Architect.*

CITY OF SHEFFIELD.

The City of Sheffield possesses three hospitals for the treatment of infectious diseases—Lodge Moor Hospital, Winter Street Hospital, and Crimicar Lane Hospital.

The Winter Street Hospital is used chiefly for convalescents. Provision is made of 100 beds in five permanent buildings. It is proposed to carry out certain alterations to one of the blocks for the reception of consumptives.

The Crimicar Lane Hospital, used for small-pox, has accommodation for thirty beds in two single storey permanent buildings.

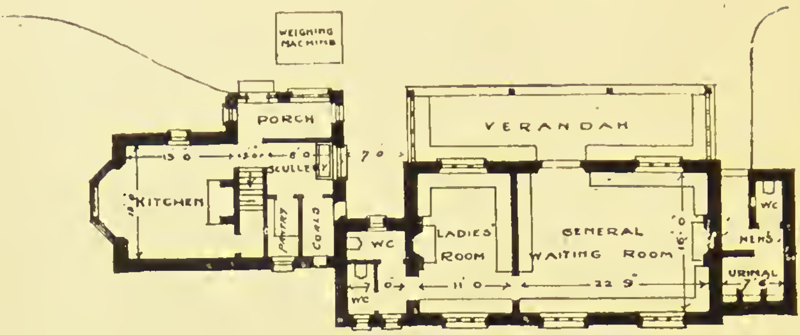
The Lodge Moor Hospital comprises a central administrative block, with a maids' house on the north side and a nurses' home on the south side, each connected with the administrative block with covered corridors. At the rear of these buildings is situate a hospital clothing store. The hospital comprises twelve temporary single storey wood pavilions, and six permanent scarlet fever pavilions in addition to an isolation pavilion, and isolation and observation pavilion.

The following buildings complete the hospital: porter's lodge and water tower, waiting-rooms, receiving pavilion, medical superintendent's house, laundry, boiler-house, mortuary, and stables.

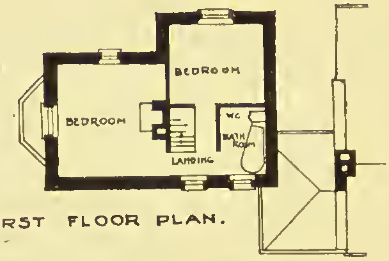
The central administrative building comprises apartments for the medical officers and matron, nurses' staff and maids' dining-rooms, kitchen, and stores. At the rear of this building, divided by the main corridor, is the dispensary, store, medical officers' laboratory, and waiting-room.

Nurses' Home.—This building provides the following accommodation on the ground floor: general sitting-room, reading-room, charge nurses' room, box-room, boot-room, cloakroom, and lavatory and water-closets. Eight bedrooms are provided on this floor, each about 8 ft. 6 in. by 12 ft. The first and second floors each provide twenty-one bedrooms, three bath-rooms and two water-closets.

Maids' Home.—On the ground floor of this building provision is made of a sitting-room, reading-room, assistant matron's sitting-room and bedroom, box-room, boot-room, cloakroom, lavatory and water-closets; also six cubicles, Entrance Lodge and Carriage Drive Waiting Room.

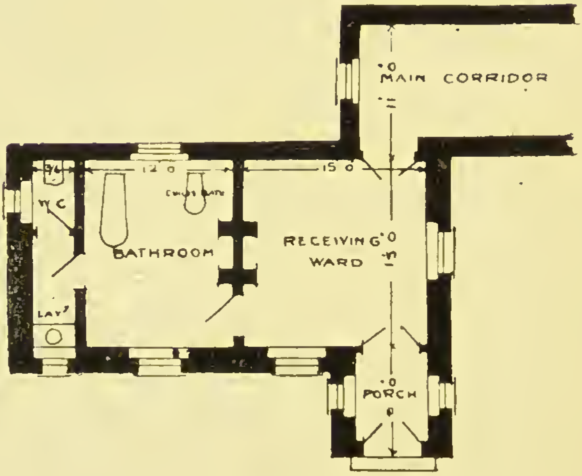


.GROUND PLAN.



.FIRST FLOOR PLAN.

Gibbs & Flockton, *Architects*, Sheffield.



Receiving Pavilion.

CITY OF SHEFFIELD.

each for one bed. The first and second floors each provide eight cubicles for two beds each, and eleven single bed cubicles ; also three bath-rooms and two water-closets.

Scarlet Fever Pavilions.—The permanent scarlet fever pavilions, which are constructed of stone, provide accommodation for twenty-three beds in each pavilion. One large ward has accommodation for twenty beds, each with 12 ft. wall space, and 156 super floor space and 2,028 ft. cubic area. Provision is made of a one-bed and a two-bed separation ward, in addition to ward kitchen, nurses' lavatory, and water-closet, linen store and pantry.

A separate bath-room is provided for the separation wards. At the end of the large wards, disconnected by small lobbies, is placed bath-rooms, water-closets and sink rooms, while one sanitary spur is provided to serve both the large ward and the two-bed separation ward. This is fitted with a water-closet and sinks.

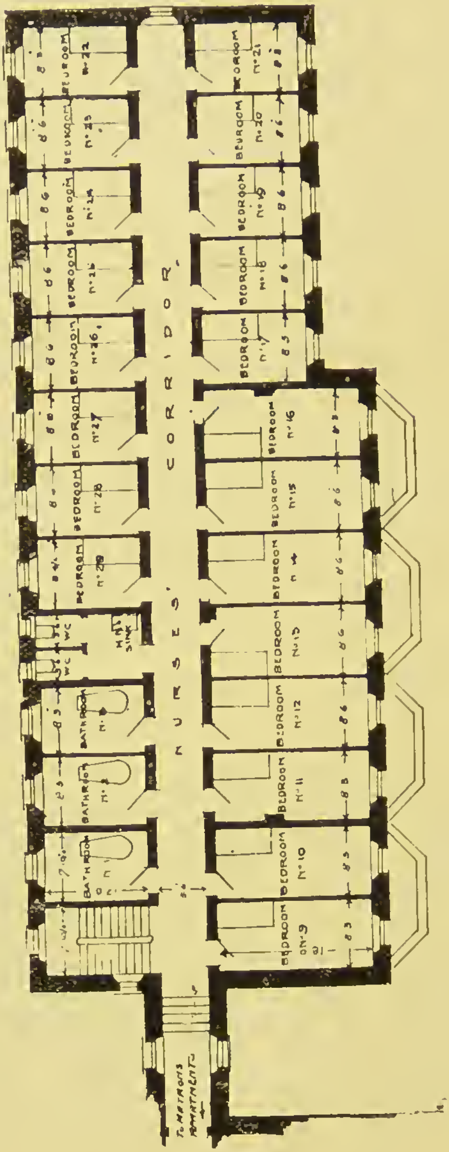
Each of the large wards are heated by central stoves in addition to hot-water services. The whole of the scarlet fever pavilions are connected with a covered corridor.

Isolation Pavilion.—The isolation pavilion comprises two blocks, each connected with an open corridor. Each pavilion comprises two two-bed wards divided by a nurses' duty room, which is provided with an inspection window to overlook each ward.

Leading off the open corridor are water-closets, sink rooms, larder, and coals. A movable bath is provided outside each pavilion.

This hospital, which was erected from the design of Messrs. Gibbs & Flockton, architects, Sheffield, has a total accommodation of 304 beds. The treatment of enteric, scarlet fever, and diphtheria is undertaken here, and according to the medical superintendent the wards are divided into acute, convalescent, and final disinfection. During 1906 the want of sufficient isolation accommodation was severely felt, and is at present supplied by one block of four two-bedded wards only. These are almost continuously overcrowded, in order to separate those cases of mixed infections, of which there must necessarily be a large number in a hospital of nearly 400 beds.

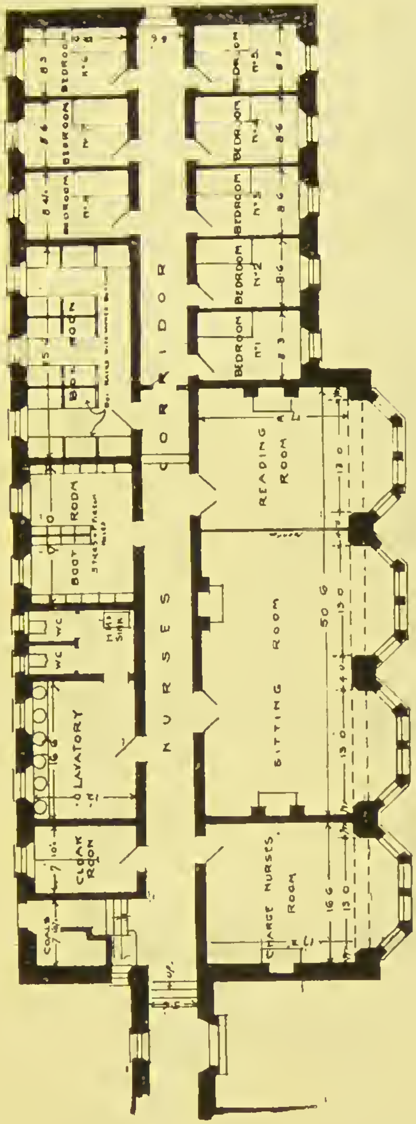
NURSES' HOME.



FIRST FLOOR PLAN:
(SECOND FLOOR SIMILAR)

GIBBS & FLOCKTON, *Architects*.

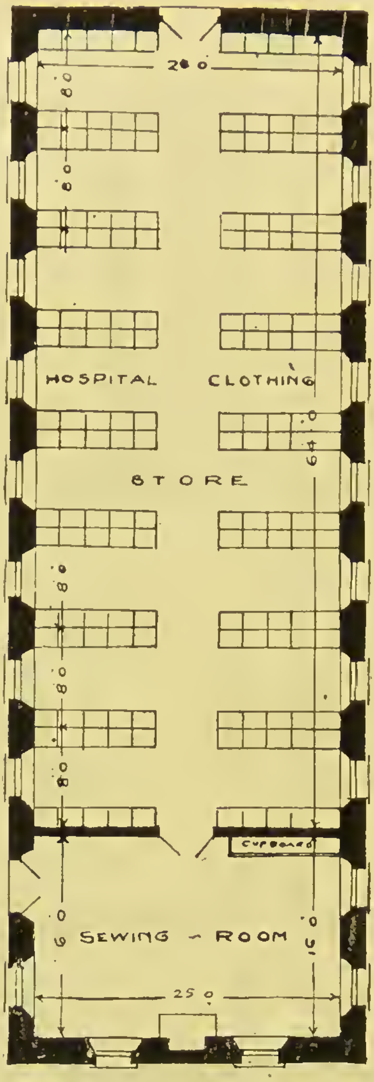
NURSES' HOME.



GROUND PLAN.

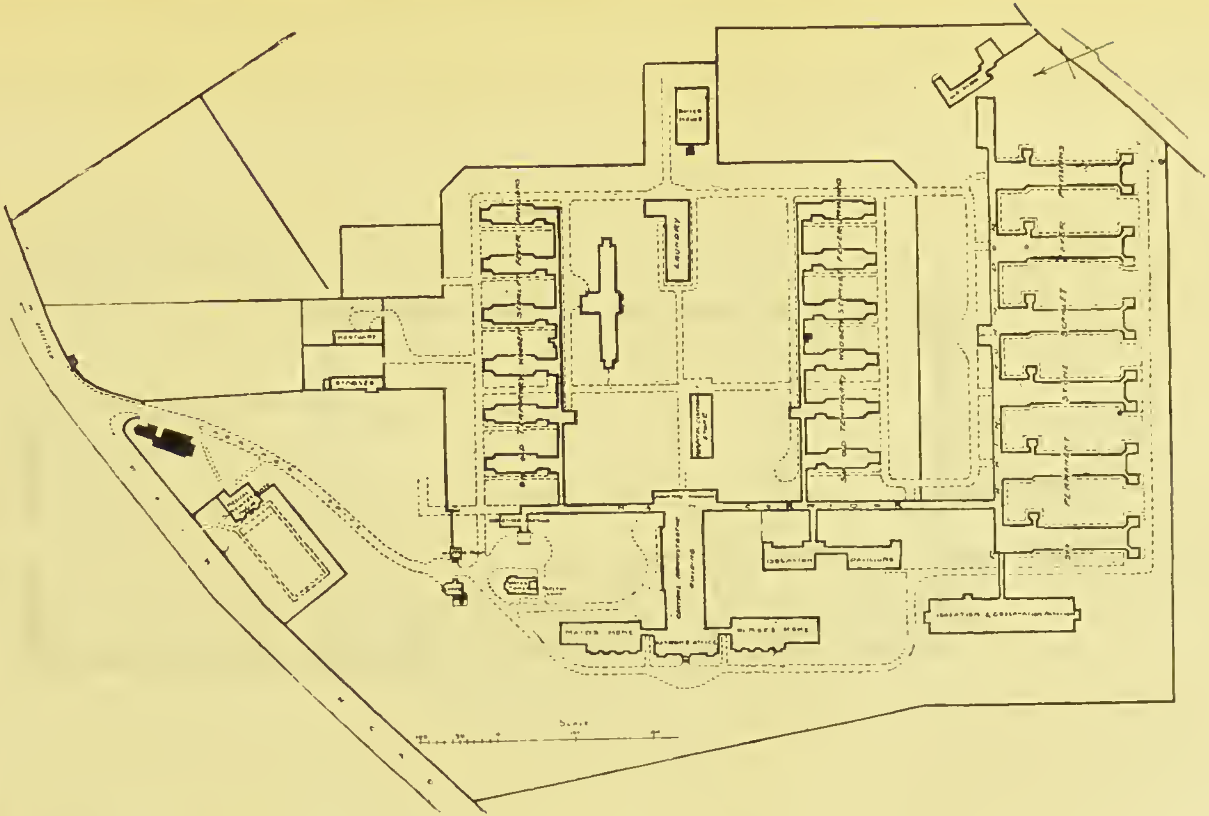
Lodge Moor Hospital, City of Sheffield.

Gibbs & Flockton, *Architects.*



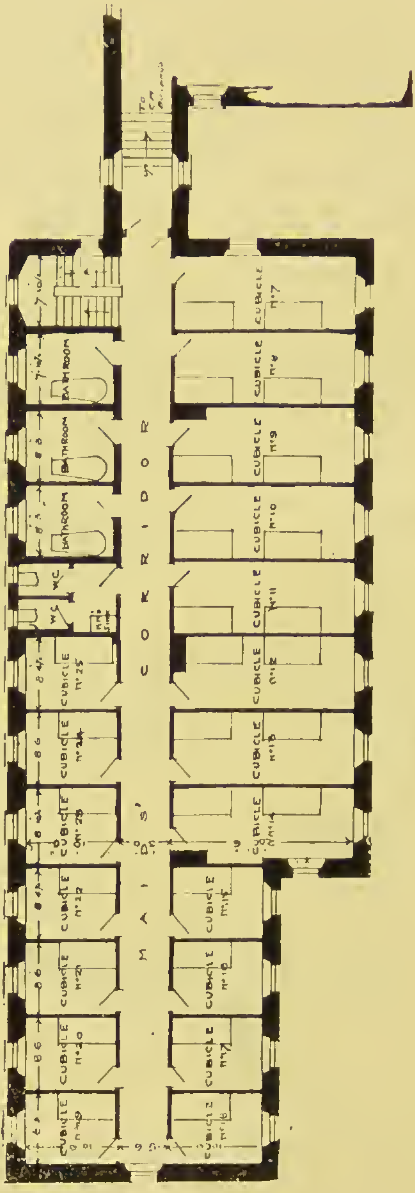
CLOTHES STORE.

CITY OF SHEFFIELD.



PLAN OF SITE.
CITY OF SHEFFIELD.
GIBBS & FLOCKTON, *Architects*.

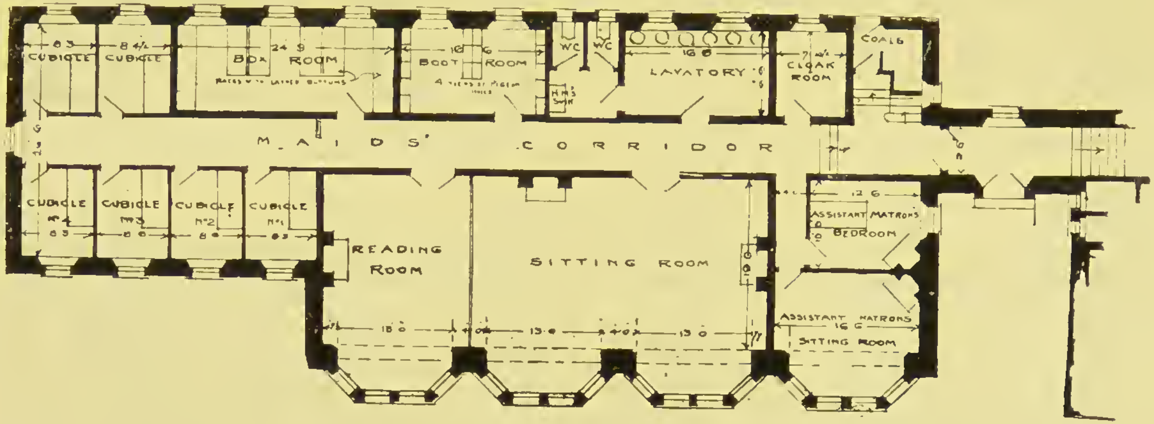
MAIDS' HOME.
Lodge Moor Hospital, City of Sheffield.



FIRST FLOOR PLAN.
(SECOND FLOOR SIMILAR)
GIBBS & FLOCKTON, *Architects.*

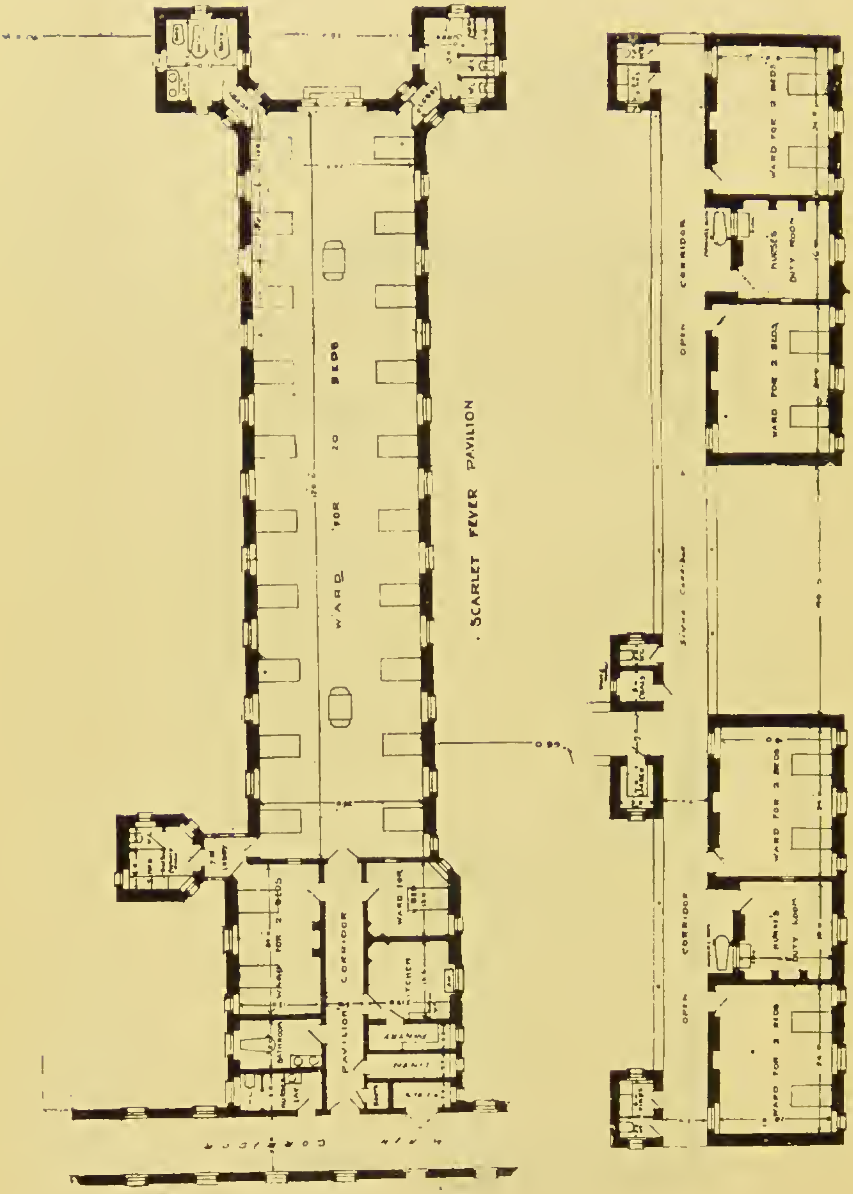
MAIDS' HOME.

LODGE MOOR HOSPITAL, CITY OF SHEFFIELD.



· GROUND PLAN.

GIBBS & FLOCKSON, *Architects.*



Isolation Pavilion.
CITY OF SHEFFIELD.
Gibbs & Flockton, *Architects.*

CITY OF SHEFFIELD.

LODGE MOOR HOSPITAL.

CENTRAL ADMINISTRATIVE BLOCK.

GIBBS & FLOCKTON, *Architects.*
[*To face page* 122.

SCARBOROUGH SANATORIUM.

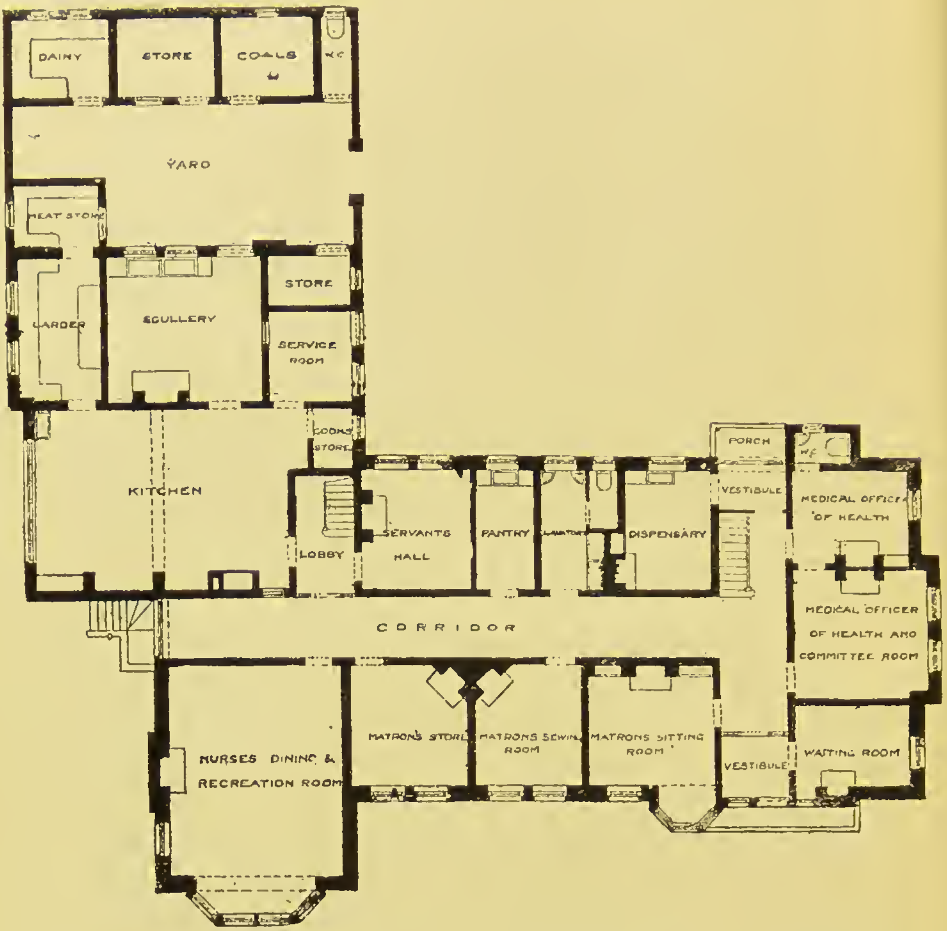
The provisions for dealing with infectious diseases in Scarborough, other than smallpox, were until a few years back totally inadequate for the needs of the borough. The cases were treated in the governor's house of the old gaol, two old warders' cottages and a brick building constructed originally during a smallpox scare, while the administrative work was carried on in a small adjacent villa. This arrangement was strongly condemned by the Local Government Board officials, and the attention of the Council was continually drawn to the need of better and more modern accommodation. The Borough Engineer was instructed to prepare plans for a new infectious disease hospital, and the work commenced in 1902, the buildings being ready for occupation in March, 1904. The site of this hospital is about 1¼ miles from the centre of the town, and outside the borough boundary.

The hospital was erected from the design of Mr. Smith, Borough Engineer, in conjunction with the late Dr. Herbert Littlejohn, and Dr. F. Dittmar, both Medical Officers of Health for the borough during the period occupied by the work. The total cost of the hospital, exclusive of the site, was £14,785.

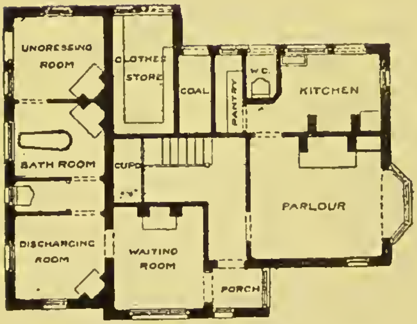
Administrative Building.—On the ground floor of this building the following accommodation is provided: Nurses' dining and recreation-room, size 17 ft. by 21 ft.; medical officers' room, with lavatory adjoining; committee-room, size 14 ft. by 13 ft.; matron's sitting-room, size 12 ft. 6 in. by 11 ft.; waiting-room, sewing-room, matron's store, servants' hall, size 11 ft. by 12 ft.; dispensary, size 12 ft. by 9 ft. 6 in.; kitchen, size 26 ft. by 18 ft.; scullery, larder, cook's store, service-room, stores, dairy, and the usual offices.

On the first floor of this building sixteen bedrooms, linen store, two bath-rooms, and the usual offices are provided. Provision is made for nine nurses and six servants.

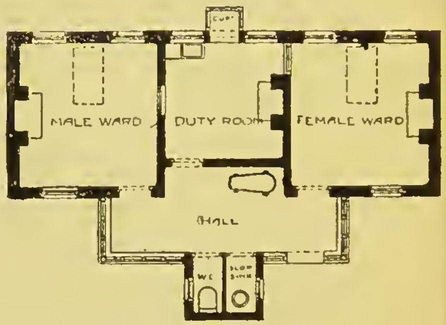
The porter's lodge and discharge block are in one combined building. Provision is made in the discharge block portion of an undressing room, bath-room, discharging room, and waiting-room. The bath-room is placed between the undressing and the discharging room. The waiting-room is entered from the porch of the porter's lodge, and has access



Plan of Administrative Block.



Plan of Porter's Lodge and Discharge Block.



Plan of Observation Block.

SCARBOROUGH HOSPITAL.

to the discharging room. In the porter's lodge accommodation is provided, on the ground floor, of parlour, kitchen, and the usual offices, while on the first floor two bedrooms, bath-room, and box-room are provided.

The scarlet fever pavilion contains accommodation for twelve beds in two six-bed wards in addition to two single-bed separation wards. The nurses' duty-room is so situated as to command a view, through inspection windows, of the large and small wards. The usual sanitary accommodation is provided at the end of each ward, and, in addition, a bath-room is provided leading from the entrance hall. On the first floor of this building a recreation-room is provided.

The enteric fever pavilion, which is similar in plan to that of the last mentioned, contains accommodation for ten beds, in two four-bed wards and two one-bed wards.

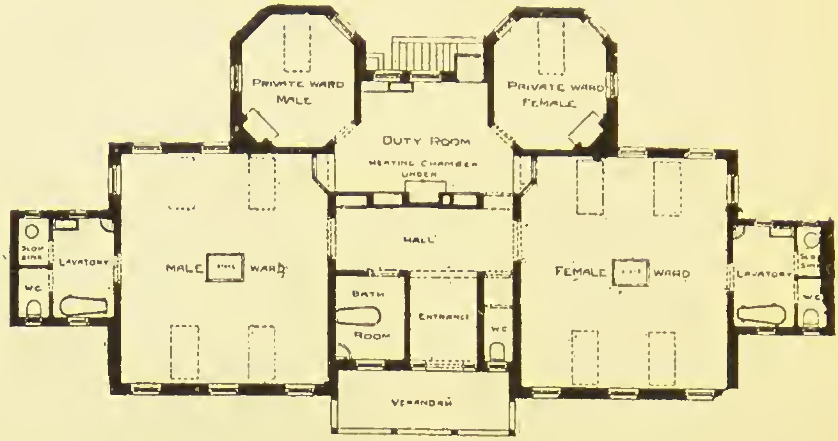
The diphtheria patients are provided for in a ward, an iron structure erected in 1892 for the isolation of small-pox.

The observation ward pavilion has accommodation for one male and one female in two single-bed wards. Between the two wards is a duty-room. At the front of this building is a verandah or hall, from which a water-closet and slop-sink apartment are entered, while provision is made of a movable bath.

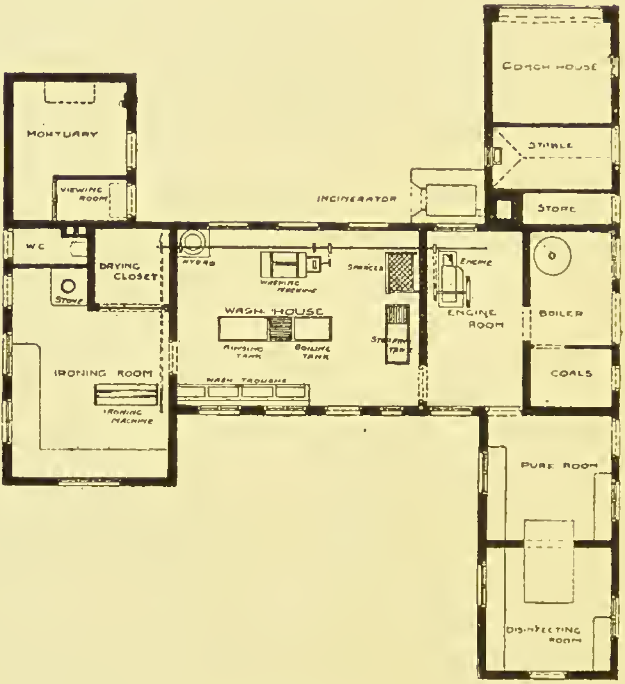
The ward pavilions are heated by means of Shorland's "Manchester" stoves and grates (double stoves being provided in each of the large wards of the scarlet and enteric fever blocks). Supplementary and independent heating is provided in the two latter pavilions, and in the administrative blocks by means of radiators on the low-pressure hot-water system. The whole of the wards are ventilated by means of inlet ventilators at the floor level, and by exhaust ventilators in the ceiling on the "natural system." The wards are lighted by means of incandescent gas.

The floors of the wards consist of polished oak blocks on concrete. The floors of the corridors, bath-rooms, lavatories, etc., are of terrazzo.

The laundry building comprises a washhouse, size 24 ft. by 17 ft., dining-room 15 ft. by 16 ft. 6 in., engine-room, boiler-house, infected and disinfected rooms, stables, and mortuary. The laundry is fitted with steam-power plant, consisting of engine, boiler, washing machine, washing troughs, hydro-extractor, rinsing and boiling tanks, sparger and ironing

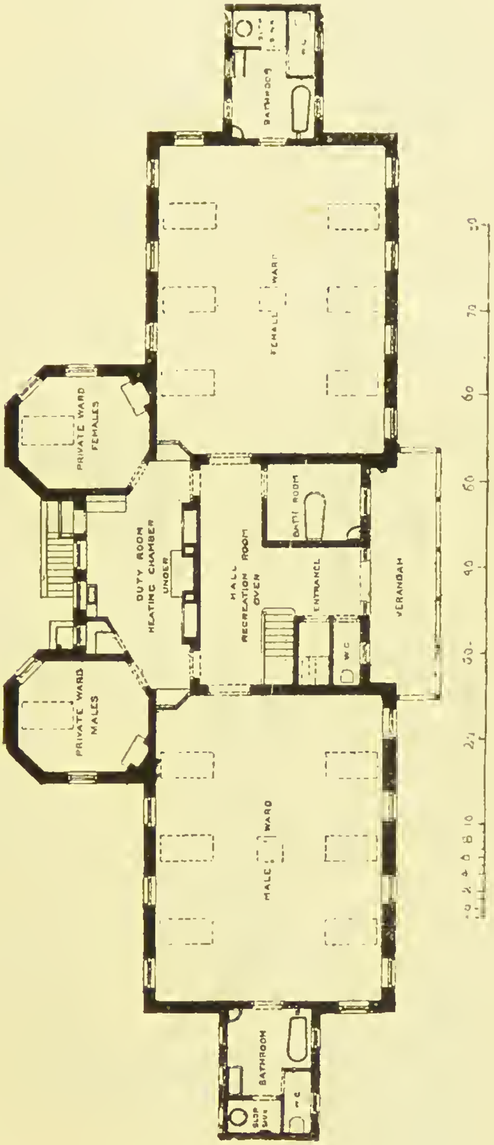


Scarlet Fever Pavilion.



Plan of Laundry.

SCARBOROUGH HOSPITAL.



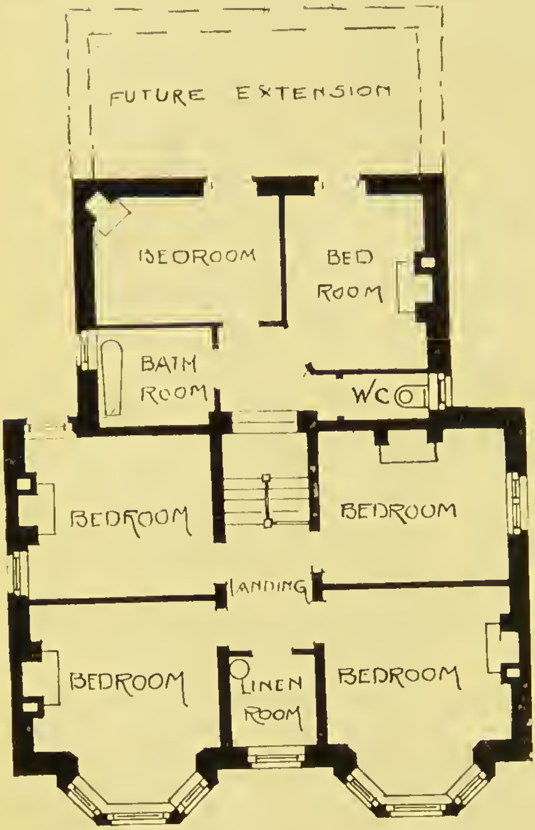
Ground Plan of Enteric Block.

machine, and drying horses. The steam disinfecting apparatus is of the Washington-Lyon type.

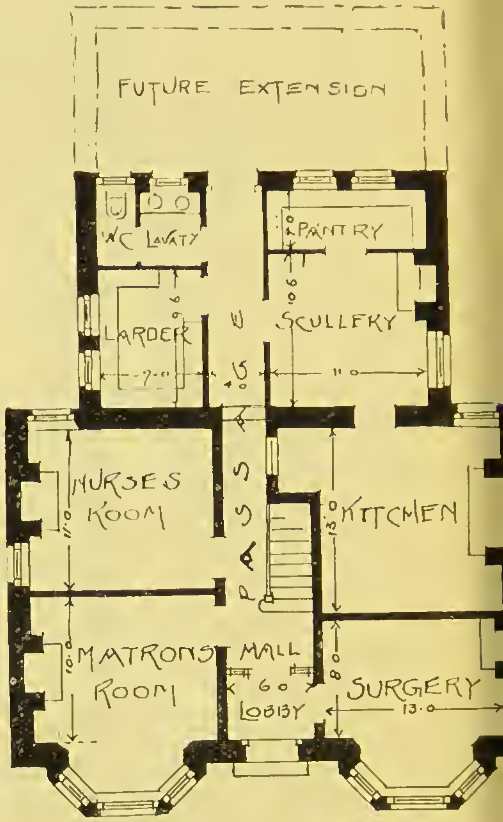
The whole of the pavilions are in communication with the administrative blocks by means of a local telephone exchange, while the hospital is connected with the National Telephone Company's exchange in the town.

It should be mentioned that smallpox cases are treated on a separate site on the banks of Scalby Beck in wood and iron buildings.

PONTYPRIDD HOSPITAL.



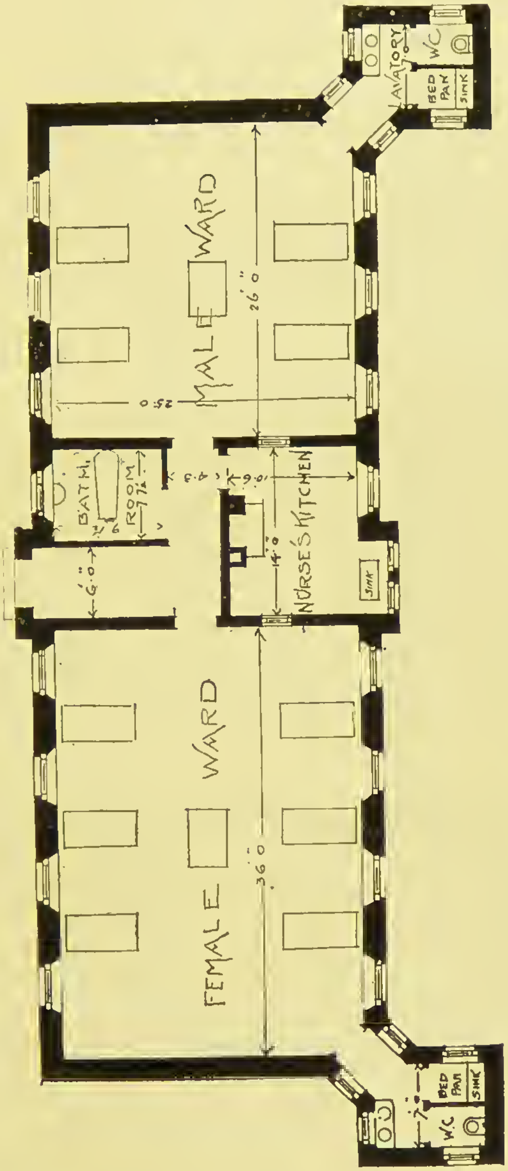
First Floor Plan, Administrative Block.



Ground Plan, Administrative Block.

Edward Rees, C.E., *Archite*

PONTYPRIDD HOSPITAL.



· PLAN · OF · PAVILION ·

Edward Rees, C.E., *Architect*, Pontypridd.

BRADFORD.

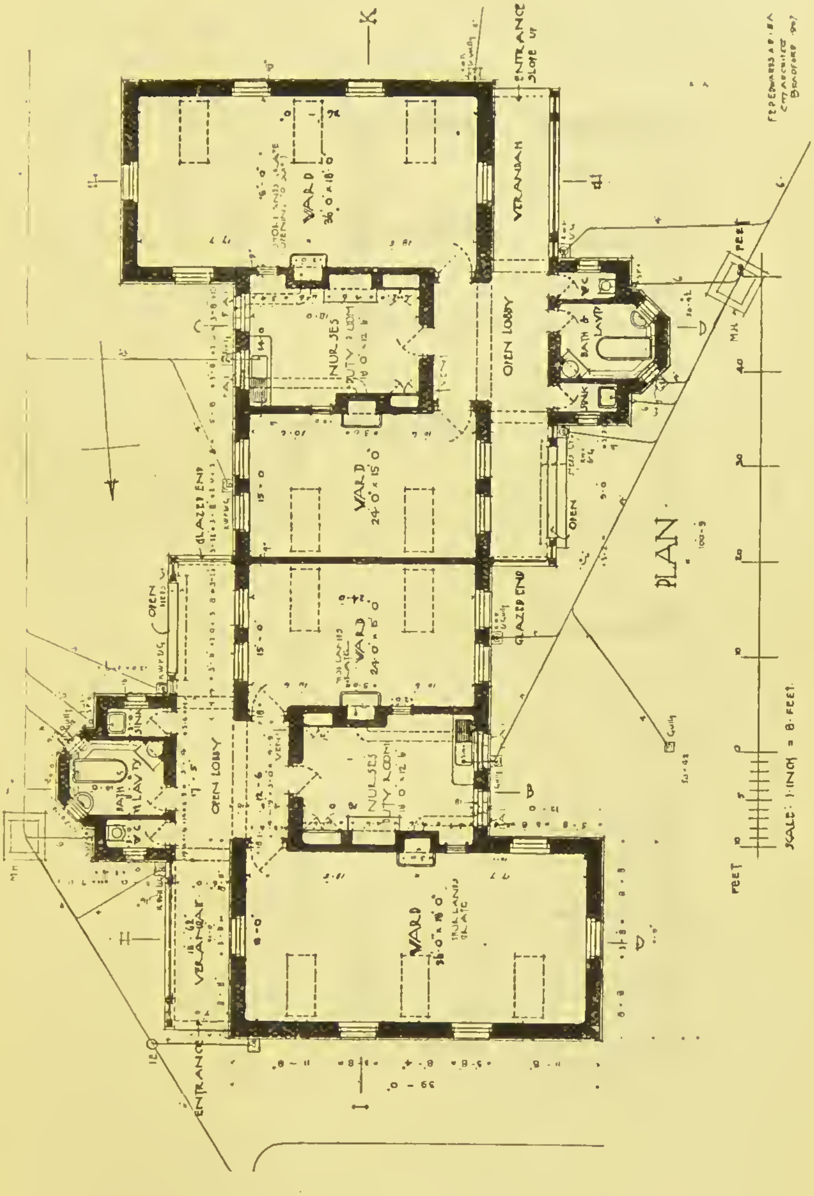
City Hospital, Leeds Road.

This hospital was erected some thirty years ago ; the planning and general arrangement, however, is such that we do not consider it of any value, therefore reproduce such buildings only that have been erected during recent years. The isolation pavilion and nurses' home, here illustrated, were erected from plans prepared by Mr. F. E. P. Edwards, A.R.I.B.A. the city architect. The isolation block being an excellent example of a well-planned fever pavilion is worthy of attention. Provision is made in this building, in addition to the usual offices, for ten beds.

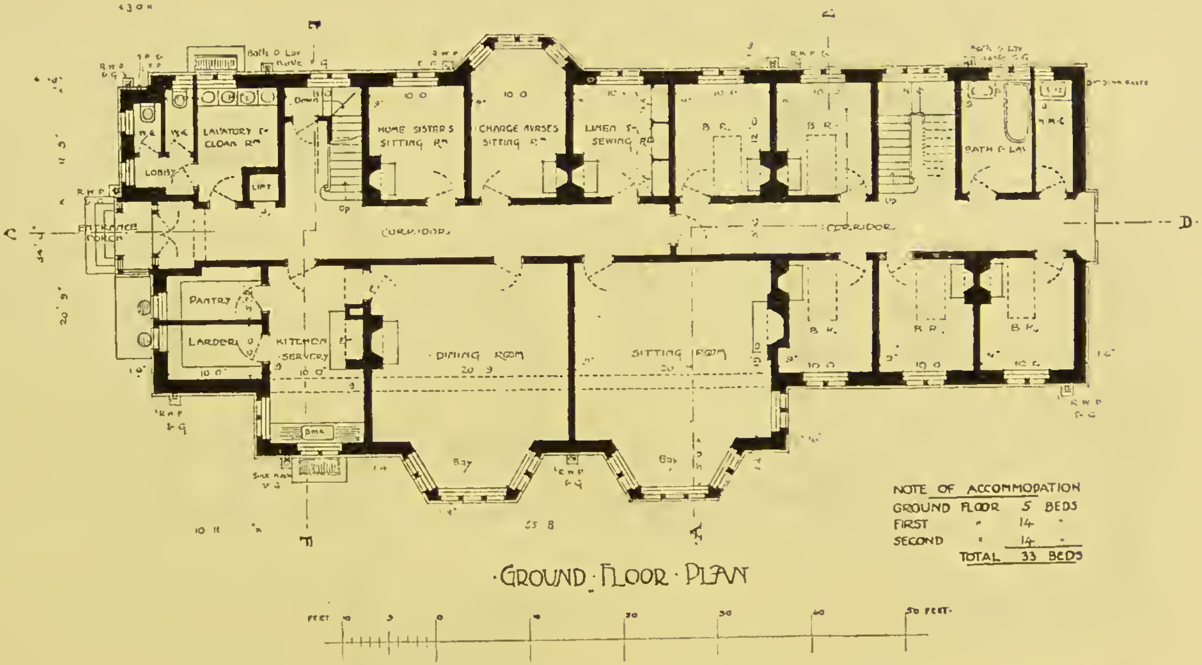
The nurses' home contains, on the ground floor, nurses' dining-room and sitting-room, charge nurses' sitting-room, home sisters' sitting-room, linen and sewing-rooms, kitchen, with larder and pantry adjoining, five bedrooms, and the usual offices. Provision is made, on the first and second floors, of fourteen nurses' bedrooms, in addition to the usual offices. A small lift is provided to serve each of the floors. The nurses' bedrooms are in size 10 ft. wide by 12 ft. long, and each room is provided with an open firegrate.

THE BLACKPOOL SANATORIUM.

This Sanatorium was originally erected in 1891 from the design of Mr. J. Wolstenholme, then Borough Surveyor, on a plot of land about four acres in area costing £1,700 ; building, equipment and laying out grounds cost £6,675, or a total of £8,375. This included two ward blocks for 20 beds and 4 cots ; administrative block ; disinfecting and laundry block and a stable. A porter's lodge was erected in 1898. In 1905–6 considerable additions were made from plans prepared by Mr. John S. Brodie, M. Inst. C.E., Borough Engineer, which included additions to the administrative block ; a new disinfecting and laundry block ; boiler house ; a 10-bed double isolation pavilion and a 22-bed double ward pavilion, giving an additional accommodation of 32 beds, CITY HOSPITAL, BRADFORD.



CITY HOSPITAL, BRADFORD.



NOTE OF ACCOMMODATION
GROUND FLOOR 5 BEDS
FIRST " 14 "
SECOND " 14 "
TOTAL 33 BEDS

·GROUND·FLOOR·PLAN

SCALE·1·INCH = 8 FEET

F. E. P. Edwards, A.R.I.B.A., *City Architect*, Bradford.

at a cost of £17,052, which included building and equipment. This was at the rate of £533 per bed.

The present accommodation is 54 beds and 5 cots, which cost £25,427, or at the rate of about £462 per bed, including the land (this is counting two cots equal to one bed). Provision is made for a future extension, if necessary, of an additional 22 beds, on the present site.

LINCOLN.

The City of Lincoln Infectious Disease Hospital, which was erected from the design of Mr. R. A. MacBrair, M.I.C.E., City Surveyor, in 1903, comprises the following buildings:—Administrative, laundry, mortuary and disinfecting blocks, scarlet fever pavilion with accommodation for fourteen beds, typhoid fever pavilion for eighteen beds, and a corrugated iron building which is used for the treatment of diphtheria. At the rear of the laundry block is a refuse destructor and van shed. A porter's lodge will be erected at a future date. The following gives the cost of the buildings at present erected.

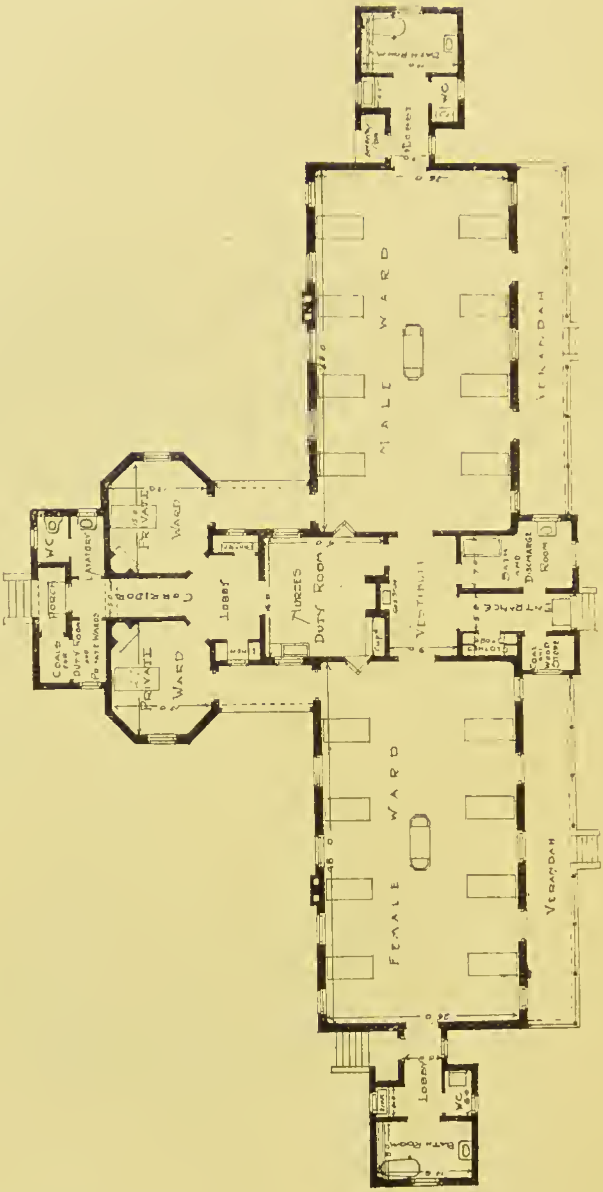
	£
Buildings	6,300
Disinfector, laundry machinery, etc.	808
Fences and gates	360
Drainage, roads, laying out grounds and planting	560
	£8,028

SEVENOAKS HOSPITAL.

The Sevenoaks Urban District Council's Isolation Hospital, erected from the design of Mr. W. H. Ansell, A.R.I.B.A., London, is a small but complete institution for the treatment of infectious disease. The site of this hospital is about two miles out of Sevenoaks, on high ground with stone and gravel subsoil. There are, at present, two ward pavilions, each with accommodation for six beds, administrative block, laundry and disinfecting buildings.

Administrative Block.—This building contains, on the ground floor, a kitchen, size 15 ft. by 18 ft., with scullery and larder adjoining; matron's sitting-room, size 14 ft. by

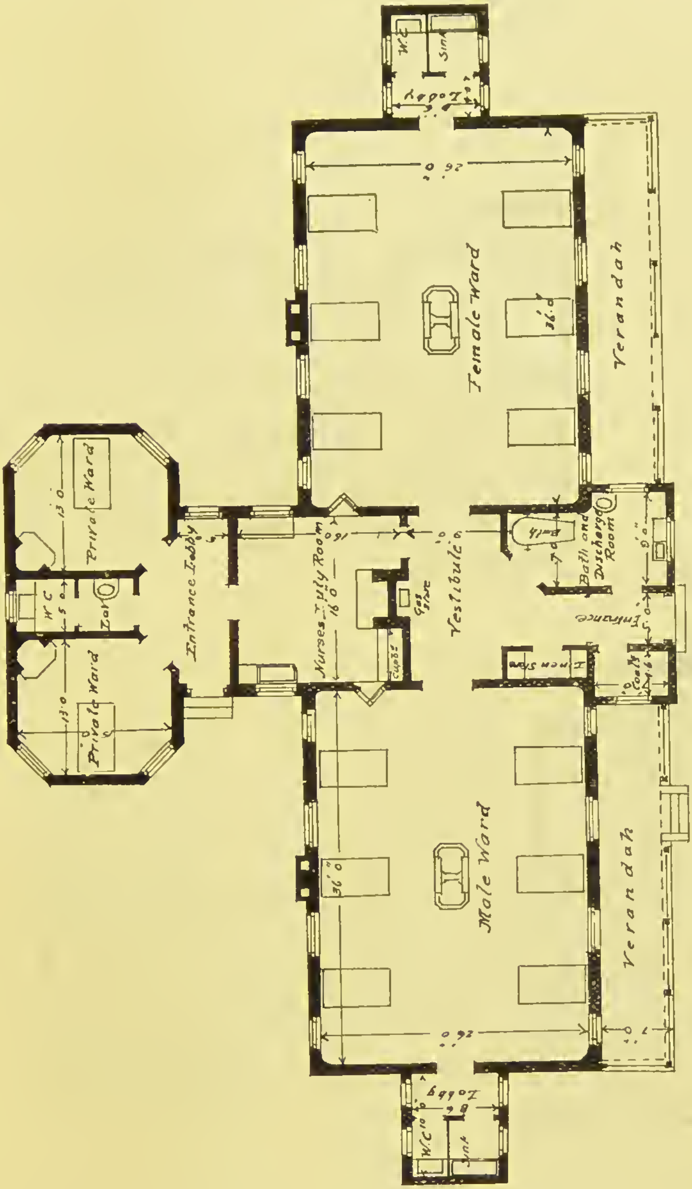
CITY OF LINCOLN HOSPITAL.



Typhoid Pavilion.

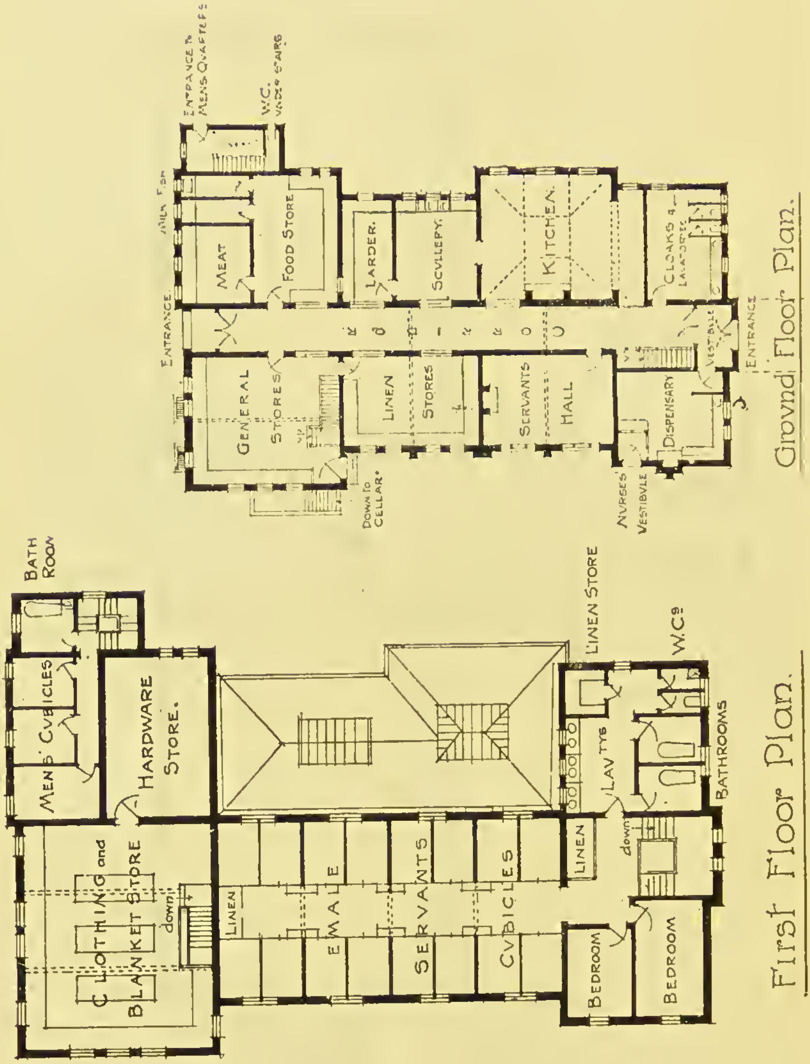
R. A. MacBrair, M.I.C.E., *City Surveyor*, Lincoln.

CITY OF LINCOLN HOSPITAL.



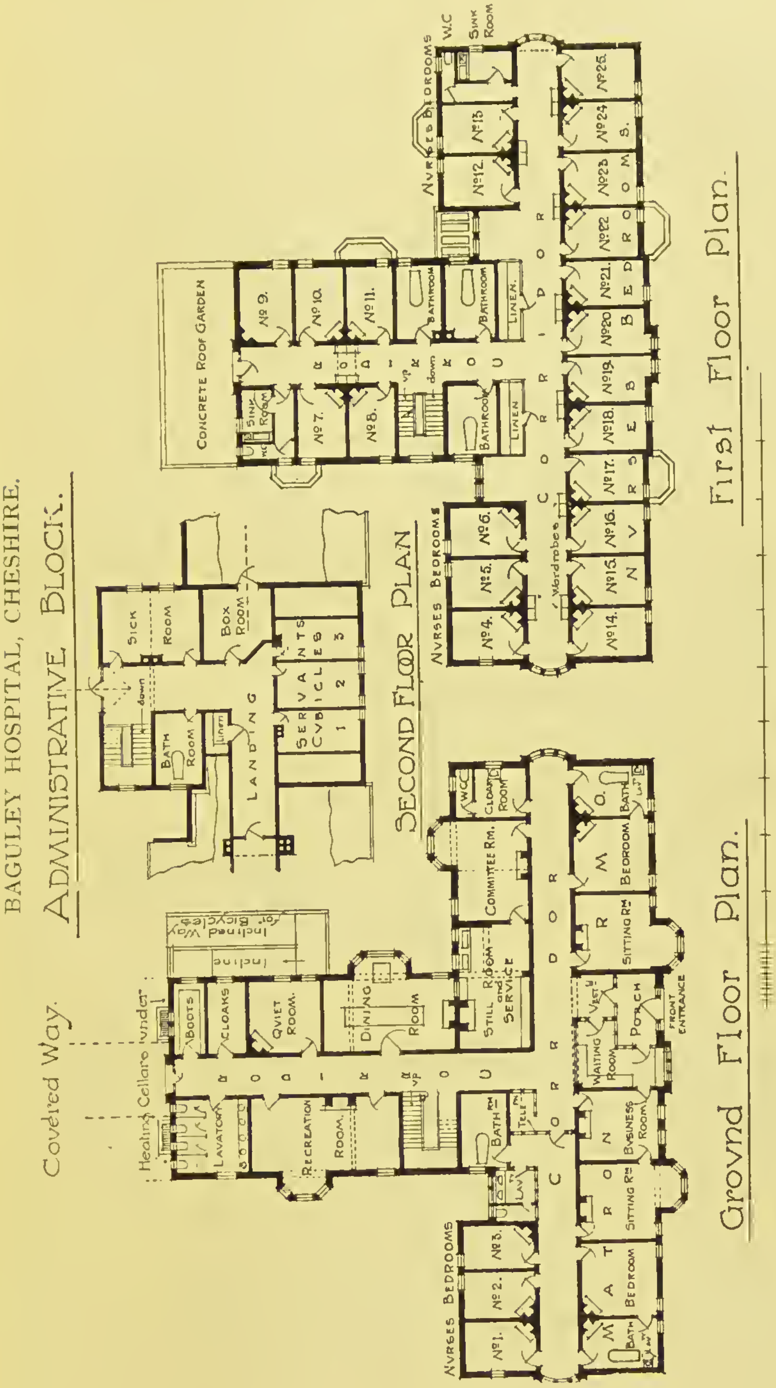
SCARLET FEVER PAVILION.

BAGULEY HOSPITAL, CHESHIRE.



KITCHEN AND STORES BLOCK.

J. B. BROADBENT, A.R.I.B.A., *Architect.*

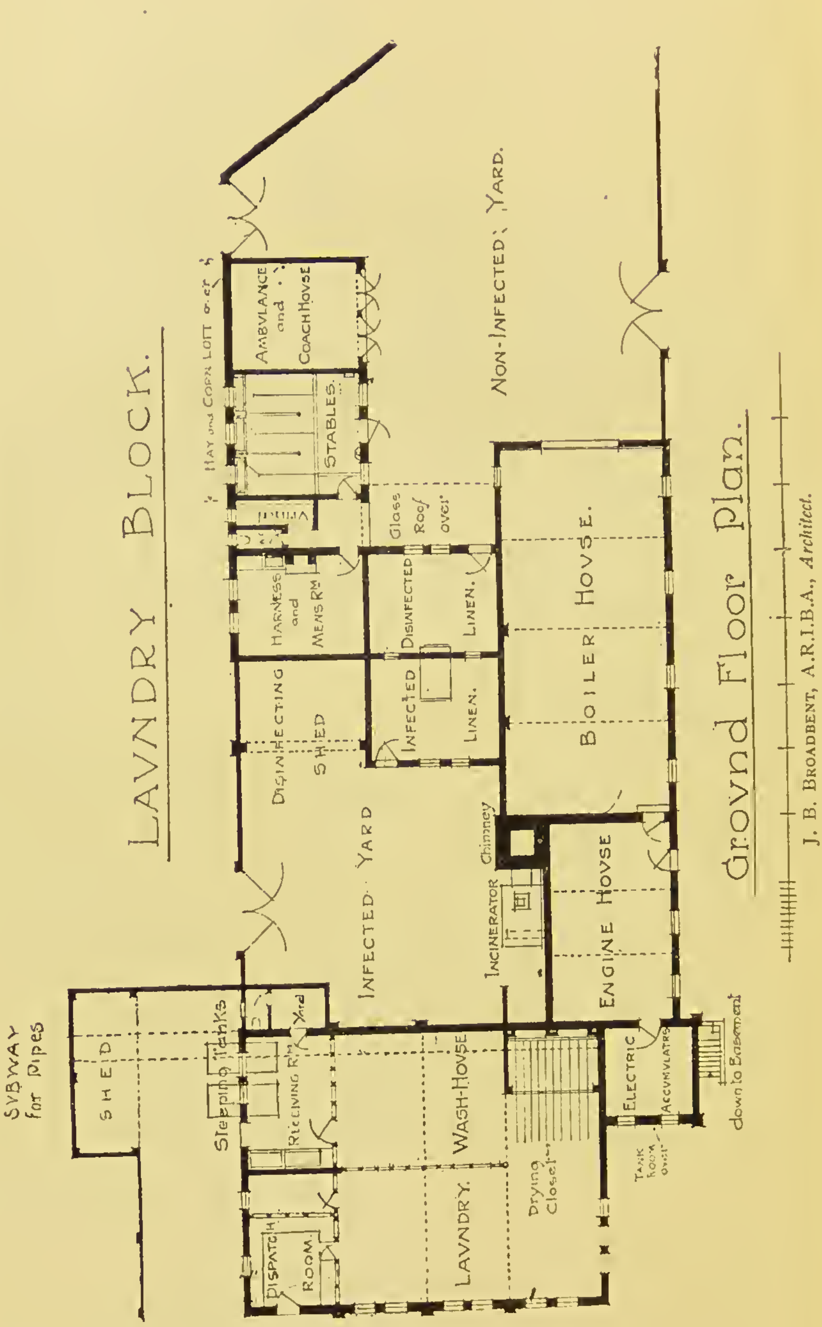


BAGULEY HOSPITAL, CHESHIRE.

ADMINISTRATIVE BLOCK.

J. B. Broadbent, A.R.I.B.A., *Architect.*

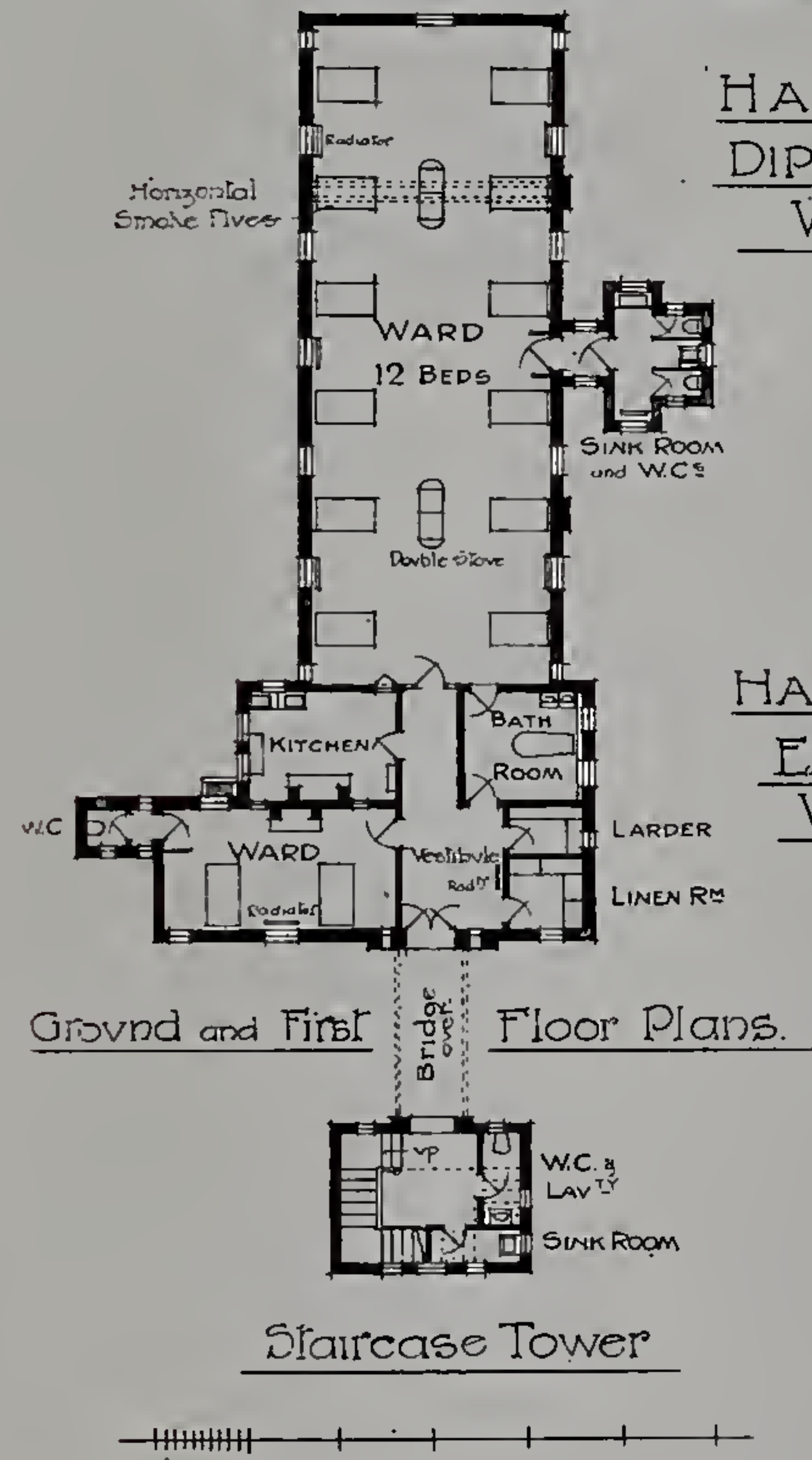
BAGULEY HOSPITAL, CHESHIRE.



J. B. Broadbent, A.R.I.B.A., *Architect.*

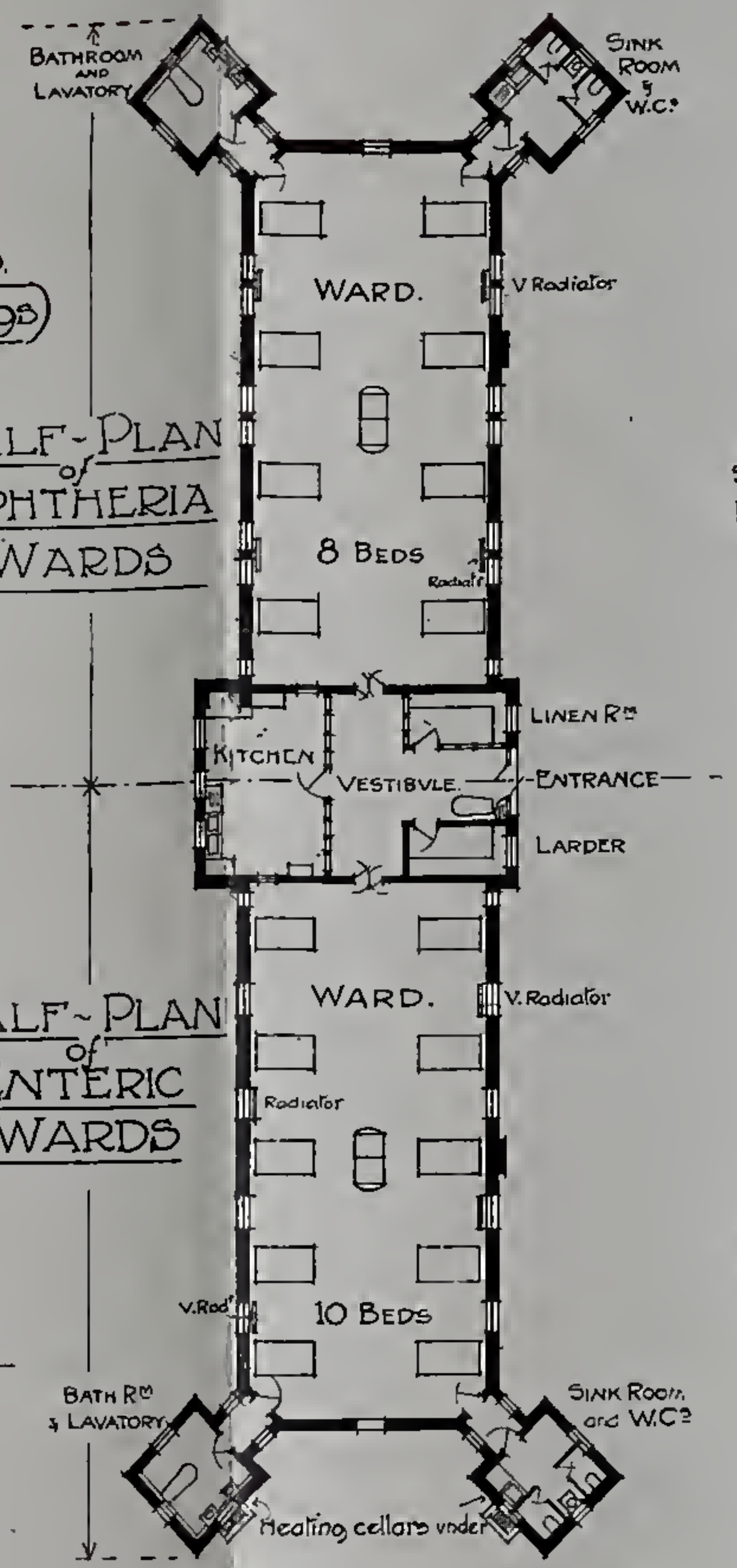
BAGULEY HOSPITAL, CHESHIRE.

SCARLET FEVER WARDS.
No 2 of these (2 Storey Buildings)



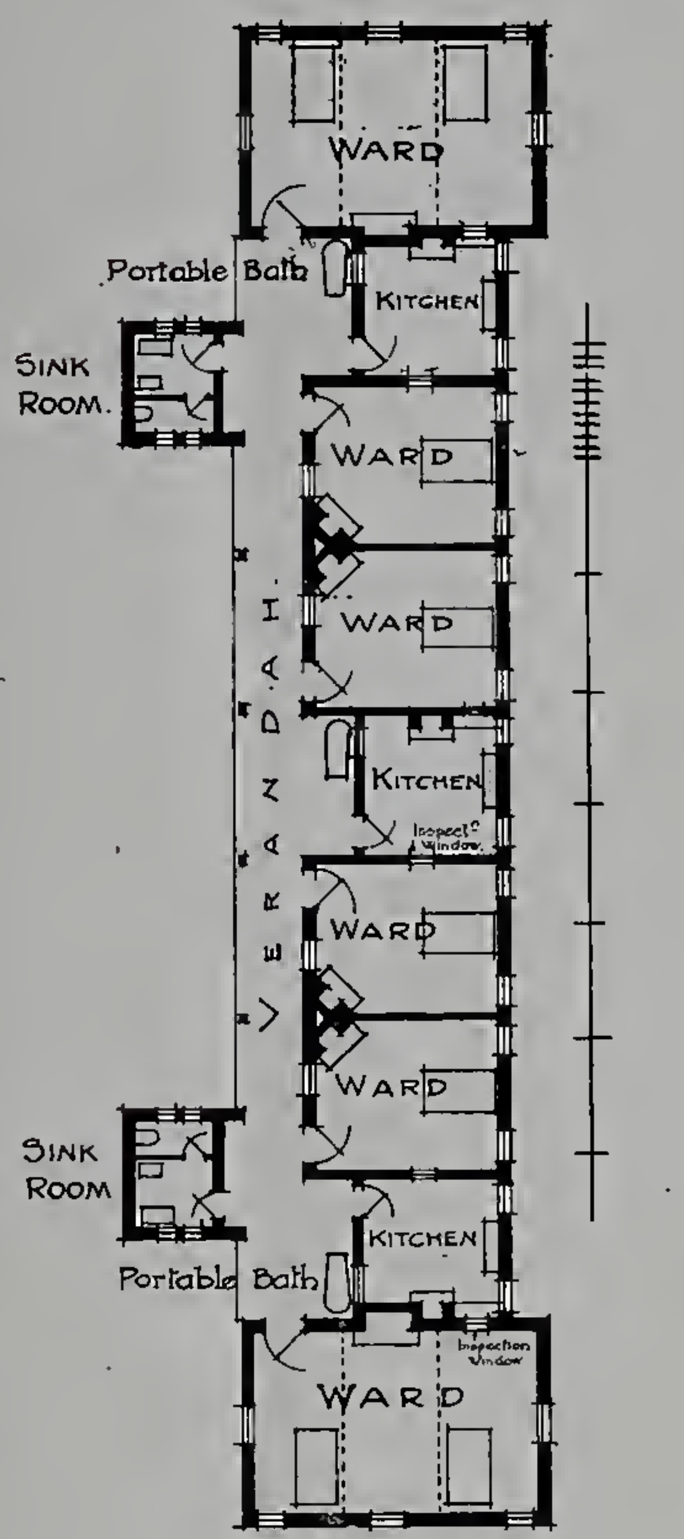
Ground and First Floor Plans.

Staircase Tower



Plan.
No 1 Enteric and 1 Diphtheria Block.
(Single Storey Buildings.)

ISOLATION WARDS.



Plan
Single Storey Building

J. B. Broadbent, A.R.I.B.A., *Architect.*
[*To face page* 138.

16 ft.; nurses' room, 15 ft. by 12 ft. 6 in., store and dispensary, in addition to the usual offices. On the first floor seven bedrooms are provided, also bath-room, water-closet and a linen cupboard.

Ward Blocks.—There are two pavilions at present erected, each having wards for the subdivision of the sexes, and an isolation ward for observation cases. In the centre of each pavilion is a nurses' duty room, size 14 ft. 9 in. by 12 ft. 6 in., with inspection windows overlooking the wards on each side. The wards are of the following dimensions, one ward for three beds, size 36 ft. by 14 ft; one for two beds, 24 ft. by 14 ft., and a single bed ward, 14 ft. by 12 ft. At the front of each pavilion is a verandah, with which is connected the usual offices. The verandah is glazed and enclosed, so that convalescent patients may use the fixed bath in the bath-room; a movable bath is also provided for use in the wards.

The bath-room is also used for the purpose of a discharge room. The ward floors are of terrazzo, with rounded angles at the junction with the walls. The whole of the wards are heated by ventilating "Radiant" stoves, burning anthracite coal.

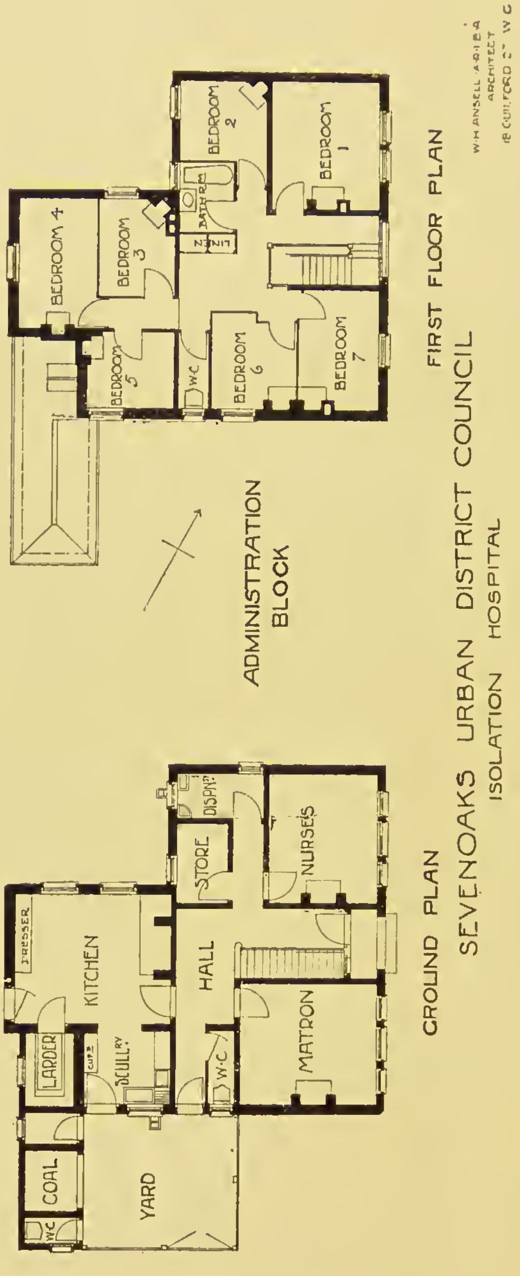
Laundry.—This is a hand laundry; the fire for heating the copper is also used to supply the hot water to wash tubs, etc. The drying closet is heated by a stove pipe from the ironing-room.

This building comprises the following apartments: wash-house 16 ft. by 14 ft. 6 in.; ironing-room, 16 ft. by 15 ft.; mortuary, 9 ft. by 14 ft.; ambulance, 9 ft. by 14 ft., and infected and disinfected rooms (in which is fitted a Washington Lyon Disinfector), coal store and water-closet.

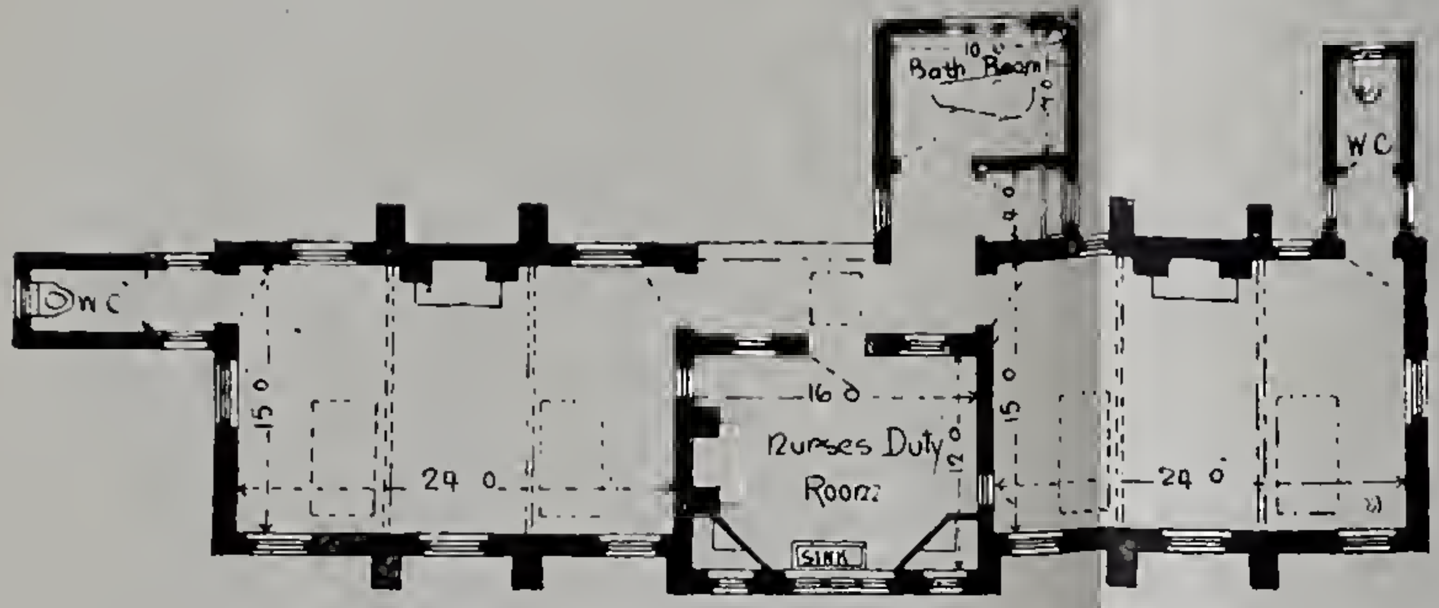
The cost of this hospital, as settled in the final accounts, was as follows:—

	£
Administrative block	1,480
Two ward blocks	2,508
Laundry and Mortuary block, including £232 for disinfector	1,007
Drainage, roadmaking, fencing and ground work	790
	£5,785

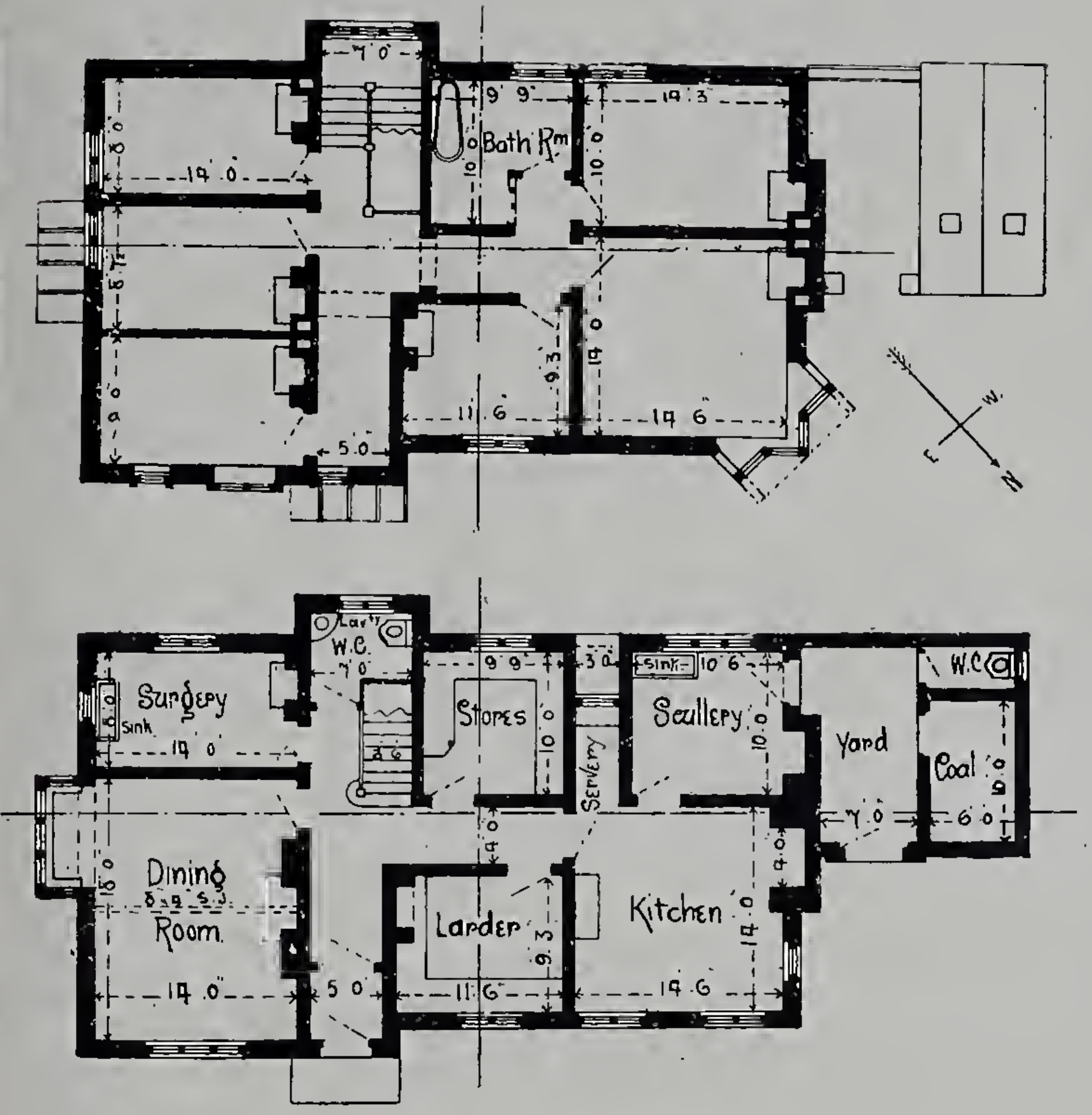
In considering the cost per bed it should be borne in mind that when the future twelve-bed ward is erected no increased accommodation will be required in connexion with the other buildings.

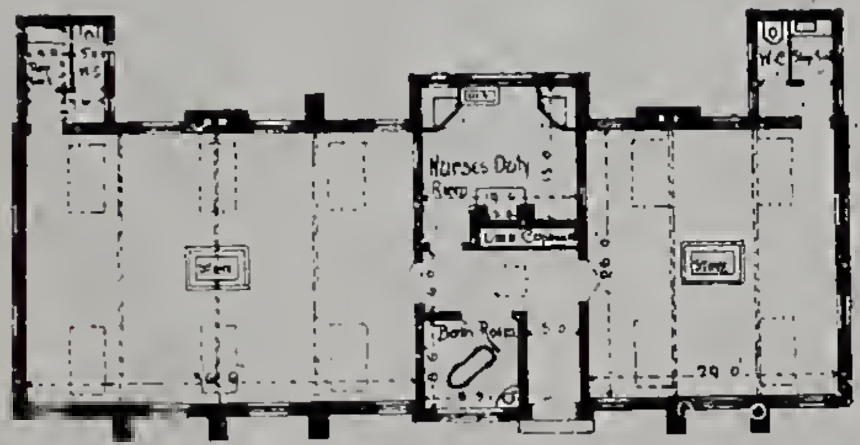

SEVENOAKS URBAN DISTRICT COUNCIL
ISOLATION HOSPITAL
ADMINISTRATION BLOCK
GROUND PLAN
FIRST FLOOR PLAN
W. H. ANSELL A.R.I.B.A.
ARCHITECT
18 GUILFORD ST W.C
BEDROOM 1
BEDROOM 2
BEDROOM 3
BEDROOM 4
BEDROOM 5
BEDROOM 6
BEDROOM 7
BATH RM
LINEN
W.C
KITCHEN
DRESSER
LARDER
CUPD
SCULL RY
HALL
STORE
DISPY
NURSES
MATRON
W.C
COAL
W.C
YARD

UPTON-ON-SEVERN HOSPITAL.

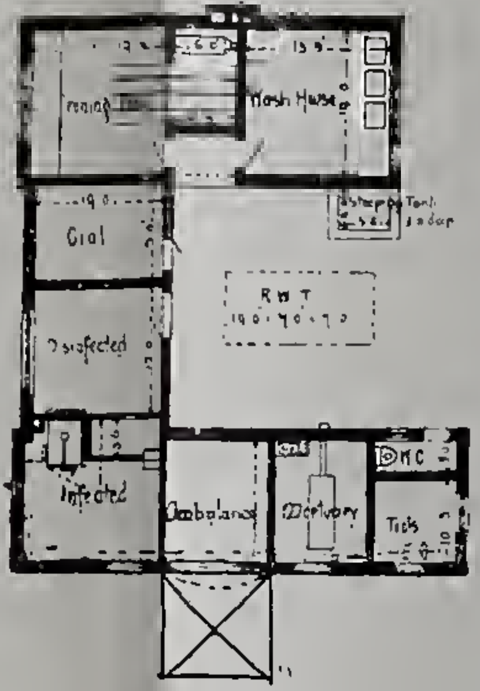


Isolation Pavilions.





Isolation Pavilion.

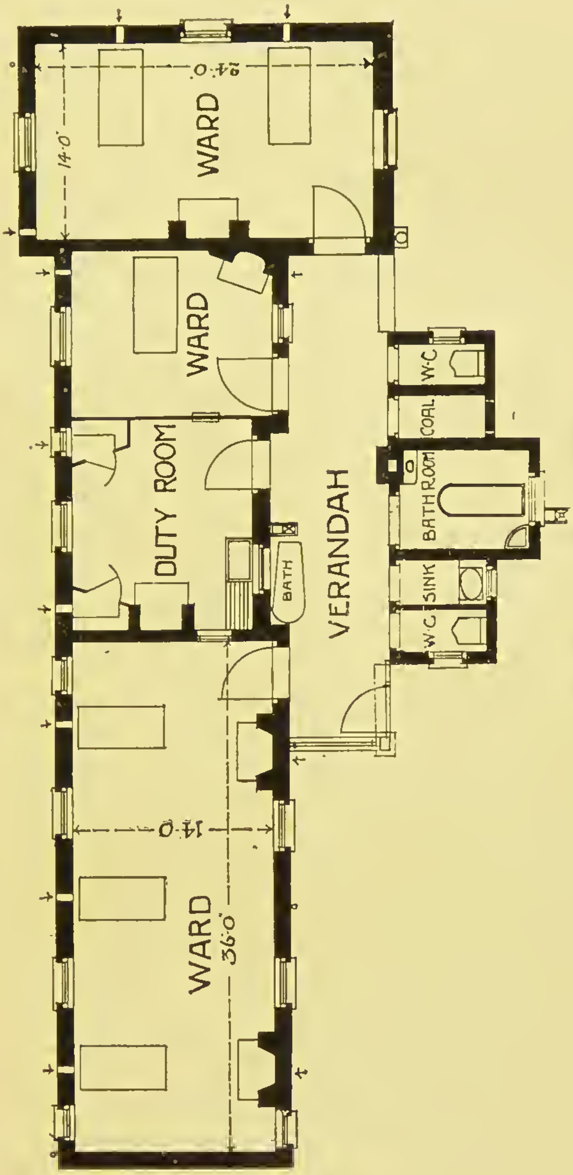


Laundry Block.

Administrative Building.

[*To face page* 140.

SEVENOAKS HOSPITAL.



W. H. Ansell, A.R.I.B.A., *Architect.*

HOSPITAL FOR CHILDREN, PARIS.

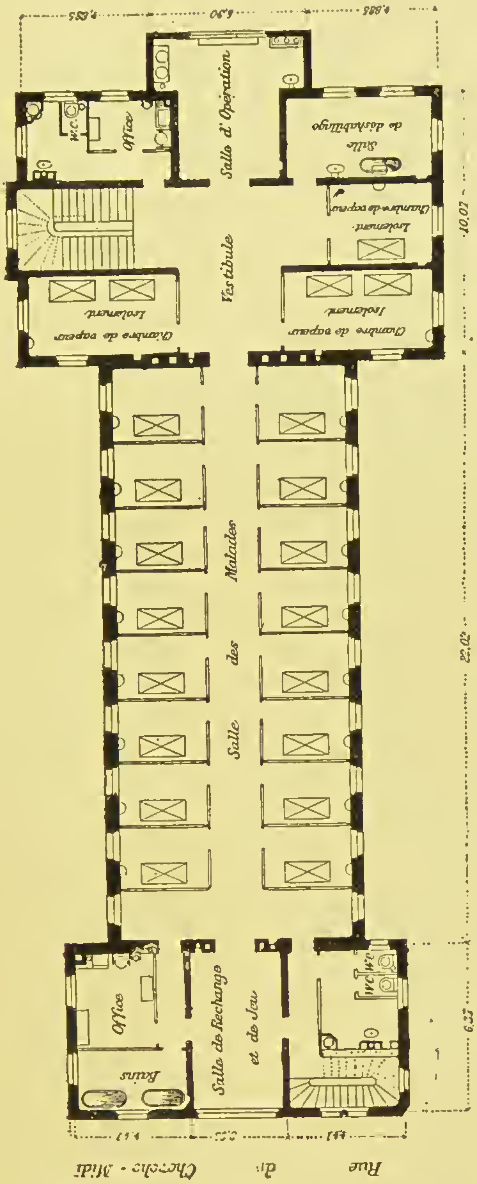
This hospital, which adjoins the general Hospital, at Paris, comprises two pavilions. They are built at the corner of the Rue Cherche-Midi and the Boulevard Montparnasse. The planning of these wards somewhat represent the principle now adopted by the Metropolitan Asylums for the reception of suspected cases, a description of which has previously been given.

The two pavilions, which are parallel to one another, are separated by a space equal to their combined height. Each pavilion consists of vaults, ground floor, and first floor; over the terminal wings (in which are staircases, entrance halls, dining-rooms, etc.) is a second floor, reserved for the staff. The arrangement of the two pavilions is similar; one is used for diphtheria cases, the other for measles.

Entering on the ground floor a students' room is first reached, fitted up with pegs for hats and coats, and lavatory basins. Here long white coats are donned, preparatory to entering the wards. Adjoining this room is another for parents and friends visiting the hospital, the office of the physician-in-charge, water-closets and lavatories. Two small wards, each with two beds, outside the main ward, are used for isolating special cases.

The large ward on this floor has a passage running down the centre, and is divided transversely by glass partitions, each section containing three beds aside. These are intended for patients who have got over the more acute stage of the disease, the small rooms at the end being reserved for cases in which the bacillus tends to persist. At the further end of the ward, separated by lobbies, are water-closets, bath-rooms and lavatories, a play-room, and nurses' room.

Ascending from the entrance-hall to the first floor we find another ward, or rather a series of wards, devoted to acute cases. This is well illustrated on the accompanying plan. Opening off the vestibule is an operating room, bath-room, lavatory rooms, and two wards, with two beds in each, adapted as hot vapour rooms for use after operations. The large ward. which is 72 ft. long by 32 ft. wide, is peculiarly constructed, Down the centre runs a passage, 18 ft. to 20 ft. high, and on each side of it, as shown on the plan, are eight small wards,



PLAN OF FIRST FLOOR, ISOLATION HOSPITAL, PARIS.

each about 10 ft. by 8 ft., and 12 ft. high. The division between each of the small wards and the main passage is of glass down to 2 ft. 6 in. from the floor. Either acute cases of diphtheria are accommodated in these sectional wards, or they are used for cases complicated by measles, scarlet fever, etc. Each child is perfectly isolated, yet does not feel lonely, as the children are visible to one another. The nurse can also easily supervise them. An additional advantage is that a restless child does not disturb the other patients nearly so much as in an open ward. Each of these rooms has a bed, a table, chair and other utensils, all of metal. A movable electric lamp is provided, and there is also a tap of water and a small sink in each chamber.

The measles wards are similar, save that on the first floor each bed is not placed in an isolated chamber, but is separated only by fixed screens of glass and metal.

The principle of glass partitions rather commends itself to us, and appears to be worthy of consideration for future hospitals for children, probably with some modification. Here, no child is allowed out of the hospital, or permitted to return to a public school, until bacteriological examination has shown the absence of Leoffler's bacillus. An examination is made in every case on admission and throughout the course of the disease, and antitoxin is regularly used. Incubation is frequently practised in cases demanding interference.

The diphtheria pavilion contains thirty-seven beds, that for measles a few more. The staff of the diphtheria pavilion consists of a resident medical officer, a day and a night superintendent, twelve nurses, and a boy.

[1] The buildings were erected from the design of M. Belouet, architect, and carried out in accordance with the suggestions of MM. Roux and Graucher. The total cost of the two pavilions was about £16,350.

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[1] *Sanitary Record*, June 15, 1900.

THE COST OF HOSPITALS.

THE ANNEXED LIST WILL GIVE SOME IDEA OF THE COST PER BED OF INFECTIOUS DISEASE HOSPITALS.

Hospital.	Approximate.				Name of architect.	Remarks.
	Date.	Cost of buildings.	No. of beds.	Cost per bed.		
LONDON.		£		£		
Fountain Hospital	1893	117,029	411	284¾	Thos. Aldwinckle, F.R.I.B.A.	Temporary Hospital (being erected under exceptional circumstances accounts for the apparent excessive cost)
The Brook, Shooters Hill	1896	286,262	568	503¾	Thos. Aldwinckle, F.R.I.B.A.	—
The Park, Lewisham	1897	228,412	548	416¾	Edwin T. Hall, F.R.I.B.A.	—
Grove Hospital, Tooting	1899	236,513	518	456½	A. Hessell Tittman, F.R.I.B.A.	—
PROVINCIAL.						
Oakwell, near Birstall	1901	12,000	—	350	J. W. Burrows	Including land and furnishing
Lincoln City Hospital	1903	8,028	32	251	R. A. MacBrair, M.Inst.C.E.	—
Sevenoaks	—	5,785	18	485	W. H. Ansell, A.R.I.B.A.	Cost per bed when complete £321
Burnley	—	36,800	74	486	F. S. Button, M.Inst.C.E.	Cost of first portion per bed £591 (including furnishing)
Crewe	1897	7,000	28	250	G. E. Bolshaw	—
Bury	—	14,000	50	280	Poole and Little	—
Bo'ness, Scotland	1902	6,834	24	284	J. P. Lawrie	Including laying out grounds
Ham Green, Bristol	1899 and	—	76	296	T. H. Yabbicom, M.Inst.C.E.	First portion erected in 1899; enlarged in 1902
	1904	—	58	246		
City of Coventry	1898	10,500	34	308½	J. E. Swindlehurst, M.Inst.C.E.	—
Harrogate and Knaresborough	1902	20,373	58	351	Strange and Worall	Including a lengthy outfall to sewer and laying out slightly grounds
Baguley, Cheshire	1903	51,211	100	512	Jas. B. Broadbent, A.R.I.B.A.	The cost of building, £41,000; engineering works in connexion with laundry and kitchen, also sewage pumps, etc., £6,598; lighting and telephones, £2,270; water supply, £1,343
Solihull Isolation Hospital	1908	8,156	—	297	W. H. Ward, F.R.I.B.A.	—
Liverpool—Fazakerley Hosp.	1906	121,475	266	456½	Thomas Shelmerdine	—
Preston Isolation Hospital	1904	—	56	—	Thomas Cookson, C.E.	—
Bridlington Hospital	—	4,900	18	272	Ernest R. Matthews, A.M.Inst. C.E.	Including furnishing and land

Disinfecting Stations

It is most desirable that provision be made in every large town of a disinfecting and personal cleansing station. In the absence of such a building, the Medical Officer of Health is greatly handicapped when an epidemic of smallpox or other infectious disease visits his district. Experience has shown that when smallpox makes its appearance, particularly in overcrowded districts, it spreads with alarming rapidity. It is therefore most essential that suitable means should be provided to prevent the spread of disease.

The Medical Officer of Health is responsible for the administration of the station. The caretaker and his wife being entrusted with the management, acting under the directions of the Medical Officer of Health : the one to cook and keep the house clean, the other to act as handyman, and, if required, to attend to the removal of the contacts.

DISINFECTING STATION.

A disinfecting station should comprise attendants' residence, two rooms for the disinfecting of clothing—completely separated from each other by a brick wall in which the disinfecting apparatus is fixed. Provision should also be made of van sheds—for vans employed for bringing in infected articles—stables, harness-room, mess-room, stores and attendants' bath-rooms.

The infected articles are brought into one room and placed in the disinfecting apparatus, which is drawn out to receive them, and, after disinfection, they are removed from the other end of the apparatus, which opens in the non-infected room.

No infectious articles should be allowed to enter the non-infected room, and there should be no direct communication between the two apartments. In some cases a wash-house is attached to the disinfecting rooms ; this department should then be connected to the non-infected room, so that the articles to be washed would be received directly into the laundry after being disinfected.

The floors and walls of the infected and non-infected rooms should be constructed of such materials that ensure a smooth and non-porous surface, and will also allow of being efficiently cleansed with water.

These rooms should be well lighted and ventilated. It is also necessary to provide a small window in the wall dividing the two rooms, so that the attendants can see the progress of work on each side of the disinfector.

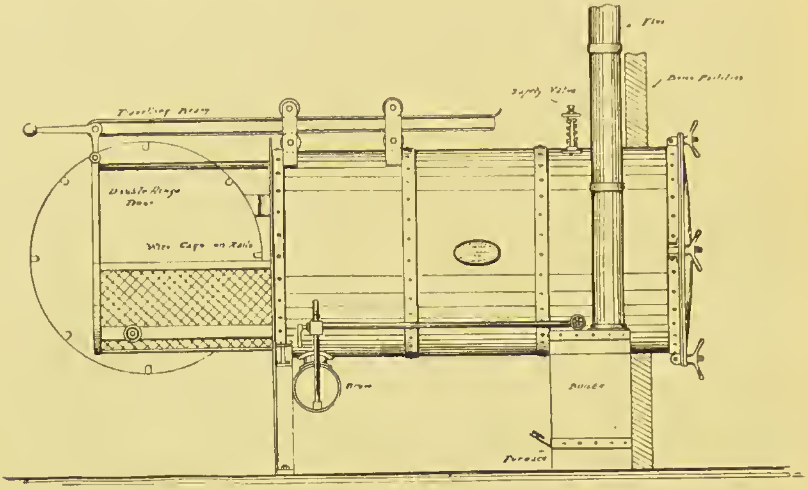
DISINFECTORS AND DISINFECTION.

Before considering the various types of steam disinfectors, it will be well to explain the meaning of the different terms used in connexion with steam disinfection. The various terms are : " current steam," " saturated steam," " superheated steam," " low pressure " and " high pressure."

The Washington Lyon was the first perfected disinfecting machine introduced to this country. The best known machines are the " Washing Lyon," the " Equifix," " Velox," " Thresh," " Barwise," and that known as the " Goddard." Messrs. Manlowe, Alliott & Co.'s apparatus, illustration of which we have previously given, is worked by high, medium, or low-pressure saturated steam. It is made of various shapes—circular, oval and rectangular. The high-pressure type is composed of an inner and outer shell of steel, the space between forming a steam jacket. The doors at each end are either hinged to the shell or hung by pulleys to a rail above. When the apparatus is close to the floor the doors revolve on a rail sunk in the floor. A wire cage for receiving the linen or bedding runs into the disinfector. As bedding forms a great feature in infected goods, and it being found most difficult to ensure thorough penetration of the steam, Messrs. Manlove, Alliott & Co. provide a vacuum-producing apparatus, or air-pump, to the apparatus. This removes the air from the chamber and the interstices of the bedding and clothing, and so leaves the goods in such a state as to allow the steam to penetrate right through.

With the Crampian Engineering Co.'s " Velox " steam coil disinfector the high-pressure principle of disinfection is adopted. It is the inventors' firm conviction that such is the only reliable method, and that the innate unreliability of low-pressure disinfectors renders their use a source of danger to the public. The steam employed in the disinfecting chamber is saturated, and therefore in the condition that is most efficient for purposes of disinfection.

The inventors claim that the "Velox" possesses the following practical advantages, viz.: Steam is raised in less than ten minutes from all cold; no preliminary attendance is required in order to raise steam previous to the arrival of the goods to be disinfected, so that one of the usual attendants can be dispensed with; the fuel being paraffin oil, its consumption is limited to the actual time of the operation, no firing-up to raise steam being necessary, and no fires remaining to burn themselves out on its completion; no stoking or clearing away of ashes is needed; the parts are few and simple, and the machine is not liable to derangement or to require frequent repairs; it is impossible for the most careless attendant to raise a pressure in the disinfecting chamber beyond that for which it has been designed, and beyond half the pressure to which it has been tested. There being no boiler to require scaling, or furnaces to require rebuilding, the machine is available for work at all times.



"VELOX" DISINFECTOR.

The boiler employed to raise steam for the "Velox" disinfector differs from those used in connexion with every other steam disinfector. Known as the "Flash Generator," it has been brought to a high state of perfection at the hands of one of the patentees. So compact is this generator that one capable of raising 10 horse-power of steam may, with its furnace and casing, be packed into a space measuring no more than 2 ft. square. Besides being compact, the generator is capable of raising steam in an incredibly short time. It is claimed that the generator cannot explode, even at very high pressures, or when short of water, and red hot. It can, therefore, be entrusted to the care of an attendant who would be incompetent to take charge of a boiler of the ordinary description.

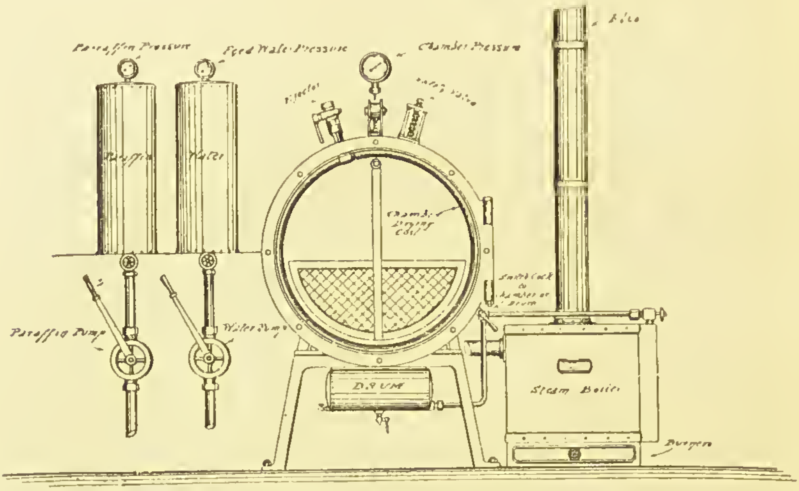
Water is supplied to the generator from a strong steel drum, into which it is pumped by the attendant. The pump is one of a rotary type, which throws up the water required with a few strokes, and which produces an air-pressure in the drum sufficient to supply the generator for a considerable period. This method of feed renders the generator automatic in action, as if the pressure rises the water in it is forced back into the drum and the production of steam ceases.

The furnace consists of a series of large Bunsen burners specially designed to consume paraffin supplied under pressure. It is regulated by a single cock, and a steady heat is maintained. The consumption of paraffin is small, a gallon being sufficient for one disinfection from beginning to end. The perfect combustion of the paraffin with this burner leaves neither smoke nor traces of dirt. The furnace is provided with air ducts, and, in addition to raising steam, warms air to be used on the completion of the operation of disinfecting in drying the contents of the chamber.

The very highly superheated steam produced by the generator would be unsuitable for use in the disinfecting chamber. It is, therefore, passed through water contained in a drum beneath the chamber, which it enters in a state of saturation and at a reduced temperature—the condition in which it is most suitable for purposes of disinfection.

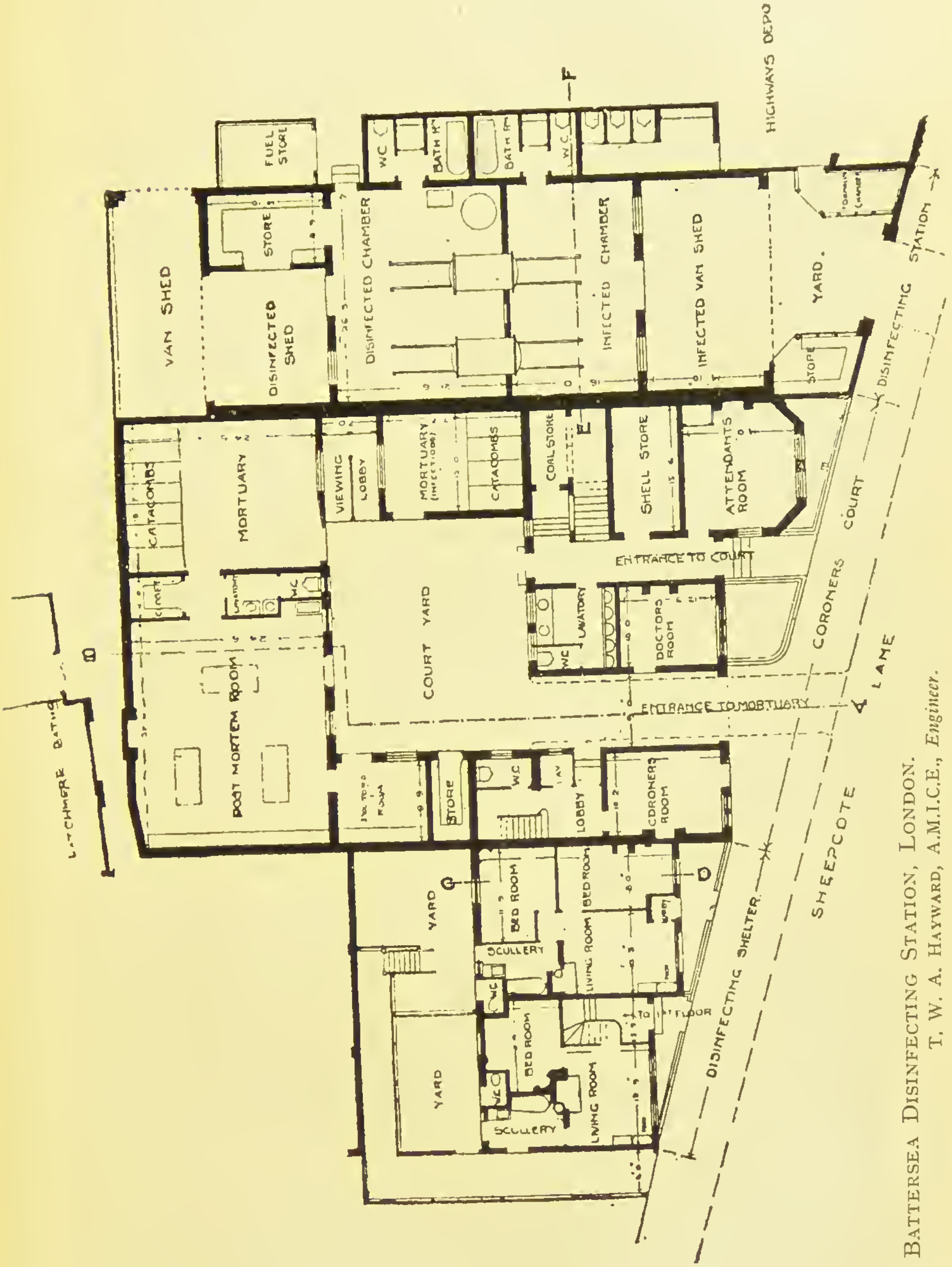
The disinfecting chamber is constructed of boiler plate, and is provided with either one or two doors at the ends, as the case may be. Within, a wire basket is fitted, to contain the goods for disinfection and to facilitate charging and discharging. The chamber is fitted with safety valves, and with a coil of copper tubing around and within it for warming and drying purposes. The "Velox" disinfector is made in all sizes, and either as a portable or stationary machine. The principle of working is the same in all. The portable machines are fitted with one door, and the stationary with two—one at each end of the disinfecting chamber—in order that infected and disinfected goods may not be handled in the same apartment.

A special feature of the "Velox" disinfector is the small cost entailed in the provision of a suitable building for its accommodation. In fact, the smaller stationary machines, specially designed for rural district hospitals, may be placed in a covered shed without detriment to the apparatus.



"VELOX" DISINFECTOR.

Of the various other machines made for steam disinfection of clothing, we will mention that of the "Thresh" and the "Barwise." The latter is a low-pressure type; it consists of a chamber containing a series of coils to which steam at ordinary boiler-pressure is supplied, and has coils taking the place of the steam-jacket in the high-pressure apparatus, thus heating the casing of the chamber before the steam is turned on. To prevent drops, which are likely to arise from condensation on the upper part of the casing, falling on the clothing, an iron hood or baffle-plate is provided. A cradle is run out at one or both ends. This apparatus is lagged with non-conducting material and covered with strips of wood. It is provided with a vacuum apparatus, and the heat from the coils may be used for evaporating moisture from clothes after disinfection. The "medium-pressure" steam disinfector is similar to the low-pressure type, but is made to obtain a higher pressure of steam. The Thresh Disinfecting Company's machine is cheap and simple in



Battersea Disinfecting Station, London.
T. W. A. Hayward, A.M.I.C.E., *Engineer.*

construction, requiring no expert knowledge to work it. They also make a portable apparatus.

PERSONAL CLEANSING STATIONS.

When provision is made for the cleansing of infected persons, as provided by the Public Health Amendment Act, 1897, it is necessary to provide bath-rooms, waiting-rooms, and undressing rooms for men, women and children. Each department—i.e. the men, women and children—being entirely separated, and each provided with a separate entrance. It is also advisable to place these buildings adjoining, or forming part of the disinfecting station, so that the clothing of those being cleansed may at the same time be disinfected.

In the construction of these buildings, the materials of the walls, floors and ceilings should be of such a nature as to allow of easy cleaning, and to prevent the accumulation of dust and germs. The partitions dividing the various rooms should not be carried up to the ceiling. By this means free circulation of air is obtained. The whole of the building should be heated by hot-water pipes and stoves, and there should be ample provision of bath, lavatory and water-closet accommodation, with hot and cold water supplies.

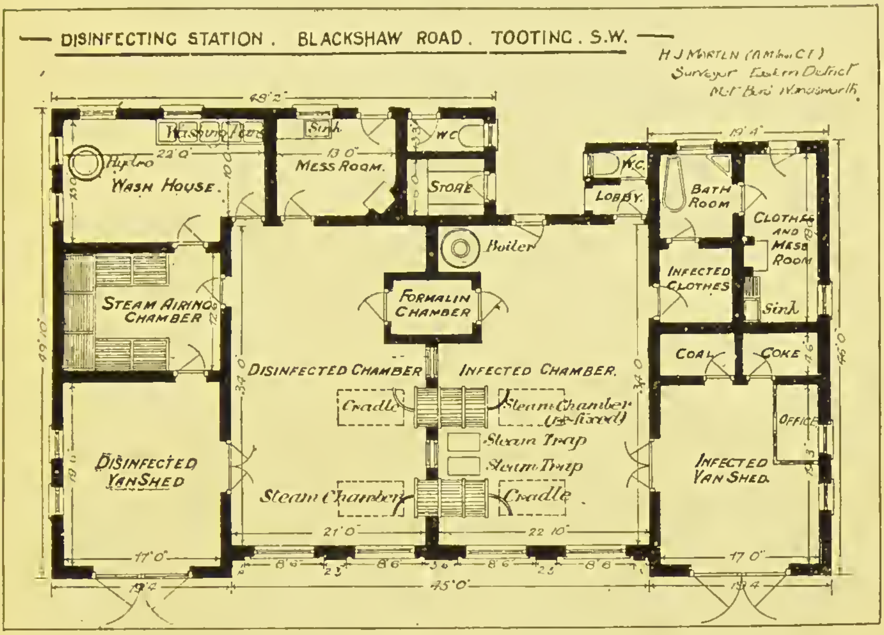
The accompanying plans of personal cleansing stations—particularly that of the City of Hull—will, we think, fully illustrate the requirements and provisions necessary for the satisfactory work of the station.

RECEPTION HOUSES.

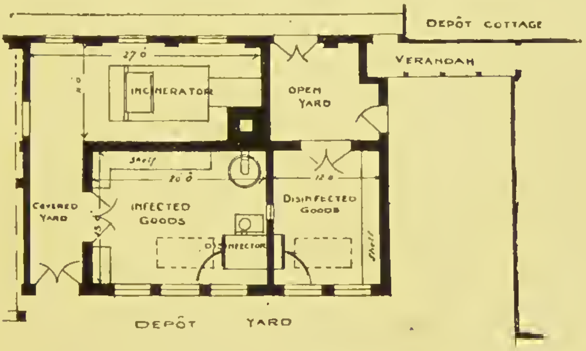
Reception houses are provided for the Medical Officer to keep a strict watch over contacts. He may remove contacts to the reception house, and either detain them for a short period or permit them to return to their homes, after their houses have been rejuvenated with lime-wash and disinfectants. Diphtheria and enteric fever contacts are only taken to the reception house when the dwellings are found in an insanitary condition.

When contacts arrive at the reception house they are received by the caretaker, who conducts them to the bath-room. After bathing they are given a change of clothing and comfortably housed, the discarded clothes being disinfected.

The reception houses should be divided into three distinct divisions, so that at any time the contacts from three different diseases may be accommodated and separated from one another. The bedrooms should be arranged on the cubicle



NEWINGTON DISINFECTING STATION, LONDON.



ROWLAND PLUMBE, F.R.I.B.A., *Architect.*

plan, and constructed generally on the lines of a personal cleansing station.

A room should be provided for children to play in during wet weather, and a sitting-room should be provided for the adults. Suitable airing grounds should also be provided for both men, women and children.

Reception houses are not generally provided as distinct from the personal cleansing station. It is frequently found that the two are made to serve the same purpose.

KENSINGTON DISINFECTING STATION.

As an example of an up-to-date disinfecting station we give that of Kensington, which was opened by the Mayor in July, 1906, and brought into operation on September 1, 1906.

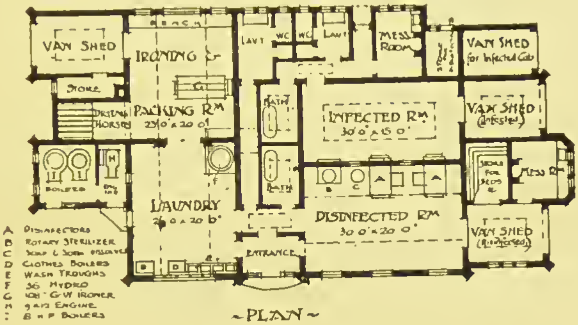
The drawings and specification for the building were prepared by the late Borough Engineer (Mr. William Weaver), after several of the most modern disinfecting stations had been visited. This station may be said to be as complete and perfect as science could make it, and the disinfection of articles is absolutely effectual. The building cost about £5,000, exclusive of the apparatus and machinery.

The exterior of the building is constructed to a height of 4 ft. with blue Staffordshire bricks, and the upper part with selected salt-glazed bricks, having glazed terra-cotta dressings. The interior is built to a height of 4 ft. with glazed bricks, the walls above being lined with glass tiles. The whole of the structure is impervious to water, so that it may be washed down inside and outside.

The following accommodation is provided :—An " infected room," 30 ft. by 15 ft., for the reception of infected articles, which will thence be placed in the disinfectors. A " disinfected room," 30 ft. by 20 ft., in which disinfected goods are received from the apparatus. A laundry consisting of a wash-house 26 ft. by 20 ft., and an ironing and packing-room 23 ft. by 20 ft. Also an air-tight chamber for the disinfection of cabs or other vehicles which may have become infected ; three van sheds, and a boiler and engine-house.

The building is so arranged that the men employed on the " infected " side of the station cannot pass to the " disinfected " side, and separate mess-room accommodation is provided for their use, with lavatories, bath-rooms, etc.

Disinfectors and Machinery.—The Public Health Committee drew up an abbreviated specification of the machinery, etc., they desired, and Messrs. Manlove, Alliott & Co., Limited, Nottingham, the makers of the particular apparatus, were invited to submit drawings and specification. Their estimate amounted to £1,650, and this was subsequently accepted. The type of disinfector used is that known as the "Alliott and Paton" pattern. The disinfecting chamber of each of the two machines is 7 ft. long, 6 ft. high, and 3 ft. 7 in. wide internally, and is fitted with a steel-framed door at each end.



KENSINGTON DISINFECTING STATION, LONDON.
WM. WEAVER, *Borough Engineer.*

The process consists of first extracting the air from the chamber and its contents; then replacing it with dry high-pressure saturated steam. After the goods have been subjected to the action of the steam at 20 lb. pressure for a sufficient period to destroy all traces of organisms, the steam is allowed to escape and a second vacuum obtained, this being broken in its turn by pure hot air, so that when the goods are subsequently removed they are not only sterile but also dry and aired. Some articles, which are wholly or partially made with leather, fur, or the like, naturally cannot be subjected to steam without damage. These are disinfected in the same machine, but are treated by formalin vapour introduced through special appliances provided for the purpose.

Each disinfector is fitted with a recording pressure gauge, by means of which a diagram of every operation is obtained as a record, and as evidence of the exact treatment that the goods have received.

When stained articles are introduced forthwith into the ordinary disinfector they are removed, after steaming, with the stains ineradicably fixed, or even intensified. A rotary sterilizer has been fixed with the object of getting over this difficulty. Articles which are received stained, or which, for other reasons, require to be washed as well as sterilized, will be placed in the sterilizer and properly cleansed without handling of any sort. On removal from the rotary sterilizer the washed articles can be taken into the laundry and placed in a hydro-extractor, and afterwards dried in a drying closet and finished on a Decondun ironer.

There is also an airing chamber in which articles may be stored after disinfection. This is placed alongside the standing place for the return vans, and is warmed by means of steam coils.

Two specially constructed vans are in use, one for the collection of infected articles and the other for delivering disinfected articles. In addition to the disinfecting assistant the following staff is employed :—A working foreman, who is experienced in engineering and stoking, called the " engineer-in-charge " ; a driver, and a disinfector who assists in collecting infected articles and in delivering disinfected articles.

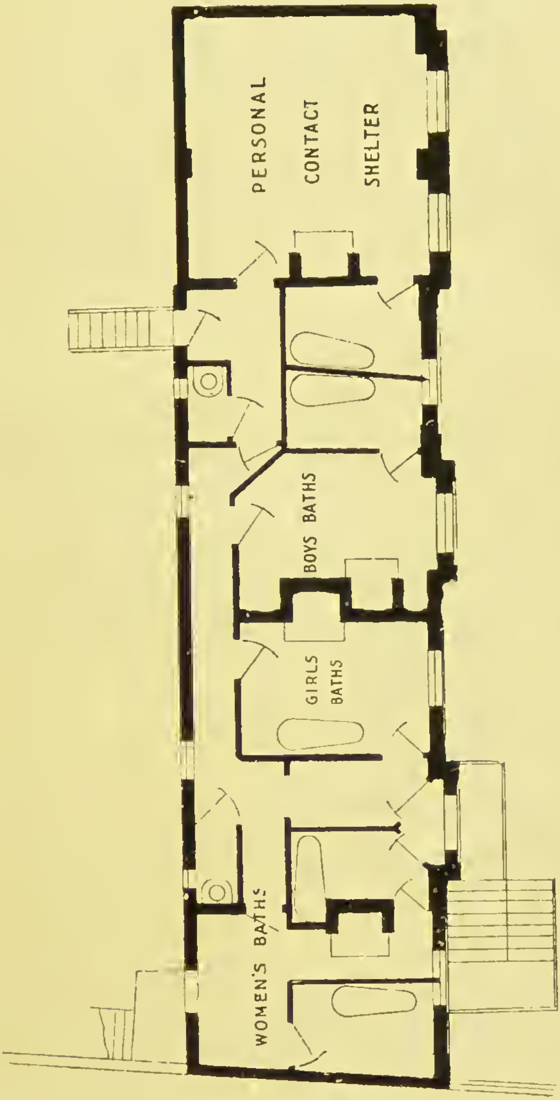
It is proposed to erect at the depôt four cottages, which will be occupied by the men engaged at the station, so that the disinfecting staff may at all times be immediately available in case of emergency.

BOROUGH OF ST. PANCRAS

Disinfecting and Personal Cleansing Station.—The provisions made by the Borough of St. Pancras for the cleansing of the body and the disinfecting of the clothing of persons applying at the personal cleansing station consists of (1) the personal cleansing house for adults, and (2) baths for school-children.

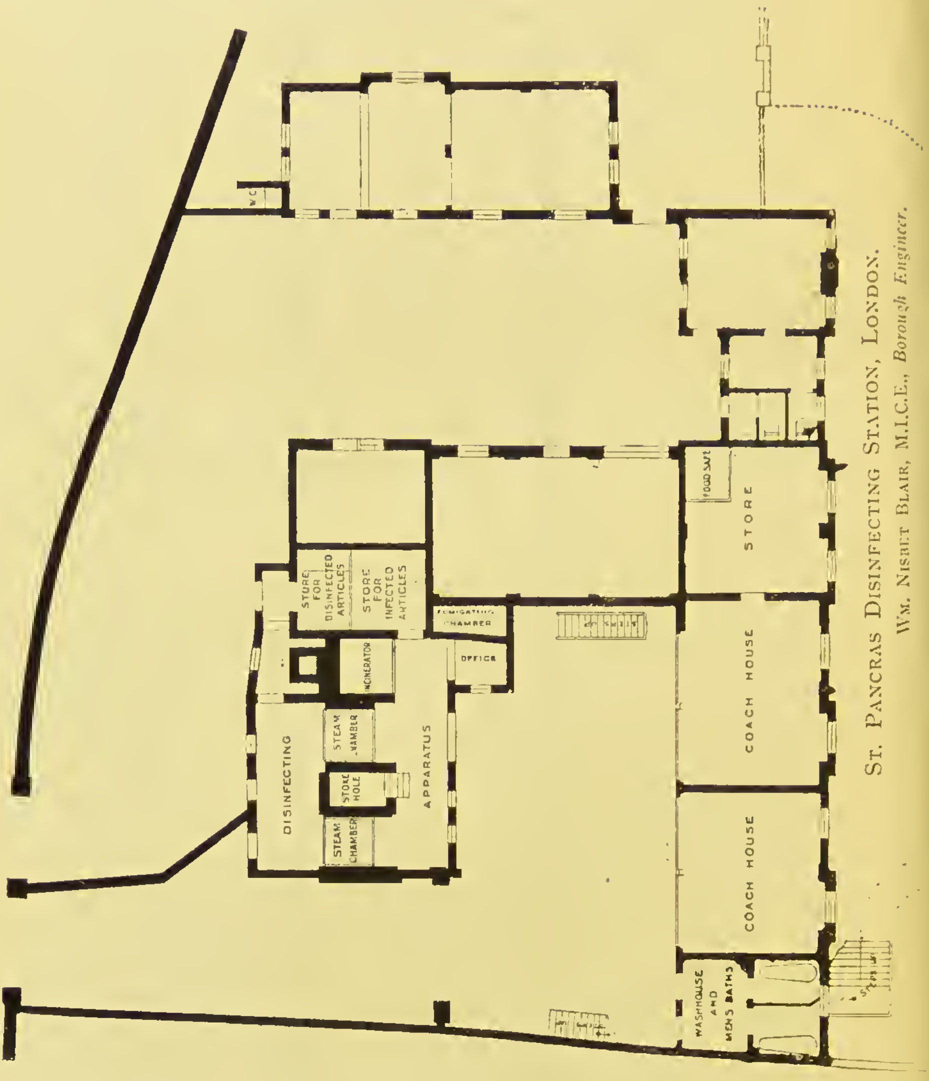
Personal Cleansing House.—In 1903 the Borough Council resolved that, in accordance with the Cleansing of Persons Act, 1897, bath-rooms and waiting places should be provided, adjoining the disinfecting station, for the cleansing of persons and the disinfecting of clothing infested with vermin. In 1904 provision was made at the north end of the contact shelter of two baths and a small waiting lobby for men on the ground floor, and two bath-rooms and a small waiting lobby for women and children on the first floor. The upper floor is reached by means of an external iron staircase, erected in the yard, as a separate means of approach for the women and children. The woman attendant at the contact shelter acts as the attendant at the personal cleansing house. This provision was completed towards the end of the first quarter

ST. PANCRAS CLEANSING STATION, LONDON.



First Floor Plan.

Wm. Nisbet Blair, M.I.C.E., *Borough Engineer.*



ST. PANCRAS DISINFECTING STATION, LONDON.

WM. NISBET BLAIR, M.I.C.E., *Borough Engineer.*

of 1904, and during the remaining three quarters of that year 1,796 men, women, and children were cleansed and disinfected of vermin. During 1905, 3,401; 1906, 2,401. "Careful inquiry," says the Medical Officer of Health, "disclosed the fact that the children mainly consisted of school-children attending elementary schools, whose parents objected to their association with verminous men and women, and indeed, objected to the mention of 'vermin,' although school-children are prone to become infected." Accordingly, the Borough Council provided separate and distinct baths adjoining the baths for adults, the contact shelter, and the disinfecting chambers.

In 1906 two rooms with baths on the upper floor of the contact shelter building were set apart for children, and separate access was obtained by means of an iron staircase from St. Pancras Gardens, and a doorway made in the west front of the building. One of the rooms is used by the boys and the other by the girls, and the corridor leading to the rooms has a glass door at each end. The door at the south end leads to the contact shelter, and that at the north end to the women's baths in the personal cleansing house, and so by the iron staircase at the rear to the yard and the disinfecting chambers, where the clothing is disinfected of vermin whilst the children are being bathed and treated by the woman attendant.

CITY OF KINGSTON-UPON-HULL, DISINFECTING STATION.

The Sanitary Committee of the City of Hull Corporation, recognizing the growing requirements of the city, decided in 1899 to erect a disinfecting station. On their instructions, plans were prepared by Mr. A. E. White, M.Inst.C.E., the City Engineer, and after due consideration the Council were recommended to sanction the erection of the proposed station on a site covering a ground area of 3,000 square yards, situate in West Dock Street, at a cost, including furnishing, of £5,000.

Formerly the disinfection of bedding and articles of clothing was carried out at the Municipal Infectious Diseases Hospitals. The demolition of the Garrison Hospital, however, necessitated the provision of further suitable accommodation.

That this disinfecting Station has proved of great advantage to the Port Sanitary Administration there is no denying. When a vessel arrives in the port with infectious disease on board, in addition to the infected persons being removed to hospital, the whole of the ship's crew and effects may be removed to the disinfecting station, whilst the ship itself is undergoing disinfection. The most important requisites of a well equipped disinfecting station are provided, the accommodation being as follows :—

Disinfecting of Clothing.—Receiving room, discharging room, disinfecting chamber for cabs, operatives' bath-room, tool store, wash-house and boiler-house.

Personal Disinfecting.—Two waiting-rooms for males and females, two bath-rooms, dressing-rooms and discharged waiting-rooms for each sex ; also office ; night shelters, with ten beds, and the usual sanitary offices.

Stables, etc.—Provision is made of a three-stall stable, harness-room, and three cab sheds. Adjoining the disinfecting station shelters are provided with accommodation for three families.

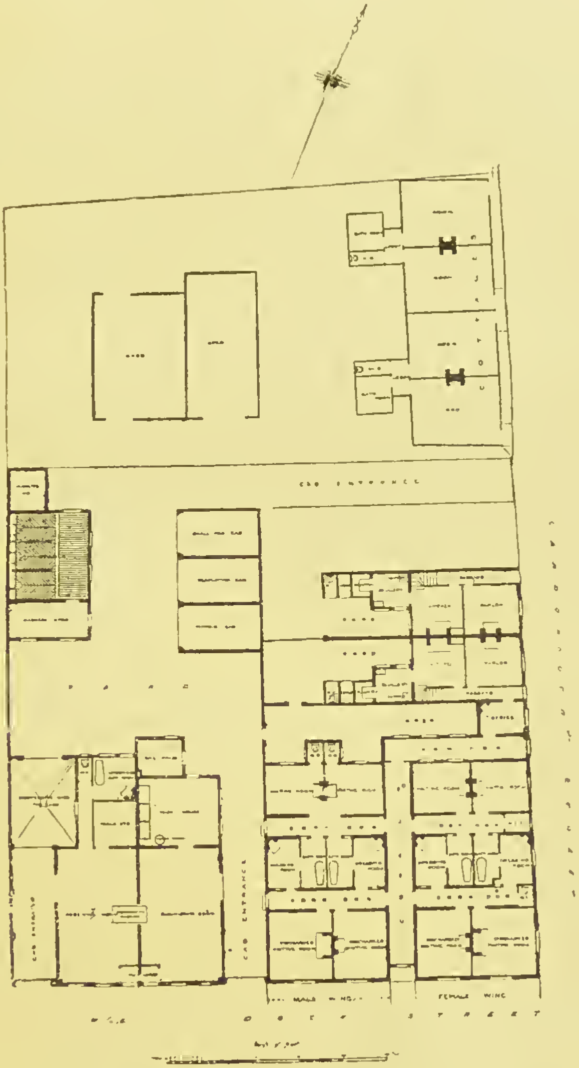
Houses are provided for the superintendent and the horse-keeper, who are available at any hour, in cases of emergency, to undertake the removal of patients to the hospital, and for the disinfection of clothing, etc.

Wash-house.—Every provision is made for soiled articles being washed which are in such a condition as not to admit of proper disinfection.

Ambulance Service.—The Sanitary Committee undertake the whole of the ambulance arrangements in connexion with the removal of persons to the hospital, and of infected bedding and clothing for disinfection, and its return home after completion ; also for the conveyance of patients to the hospital and their return home after convalescence.

We are informed by Dr. J. Wright Mason, the Medical Officer of Health, that the want of a disinfecting station was greatly felt during the earlier stages of the last outbreak of smallpox, and had it then been available would undoubtedly have greatly tended to minimize the infection and spread of the disease ; and still more recently the threatened outbreak of plague, which, however, was fortunately confined to its original centre of contagion.

Description of the Station.—It will be seen from the accompanying illustration that the disinfecting station, stables, personal cleansing, and attendants' houses, are completely isolated from each other, and are at the same time provided with easy means of communication.



City of Hull Disinfecting and Personal Cleansing Station.
A. E. White, M.Inst.C.E., *City Engineer.*

In the personal cleansing station provision is made for each person of a waiting-room, bath-room, dressing-room, and discharged waiting-room. On the admission of a person he is undressed and bathed. His clothes are passed through a small opening in the wall, and after being disinfected are in the same manner returned to the dressing-room.

One suite of rooms is used for filthy verminous persons, and is completely isolated.

The floors of the corridors and bath-rooms are laid with terrazzo paving, while the other rooms are covered with pitch pine battens in narrow widths. The walls are faced with glazed brick dadoes and plastered above. In the construction of the buildings every endeavour has been made to make them as complete and sanitary as possible without any undue expenditure.

Isolation Cases.—In small houses and tenements it is frequently found impossible to satisfactorily carry out disinfection, and it occasionally happens that persons from infected houses have to stay with their friends whilst their own dwellings are undergoing disinfection by the sanitary officials. To meet the requirements of such cases arrangements are made at this station so that families, and those who have been engaged in nursing the sick, may be removed for bathing and the disinfection of their clothing. They are isolated in shelters attached to the station.

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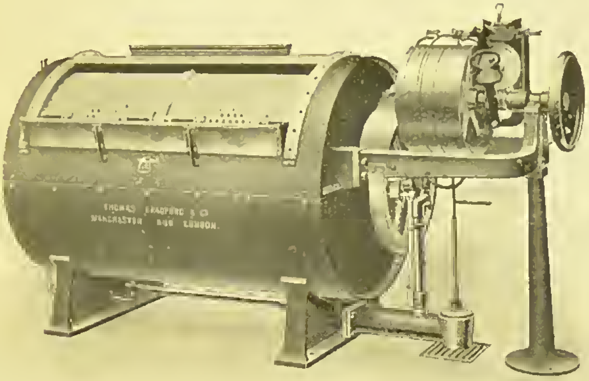
LAUNDRY MACHINERY



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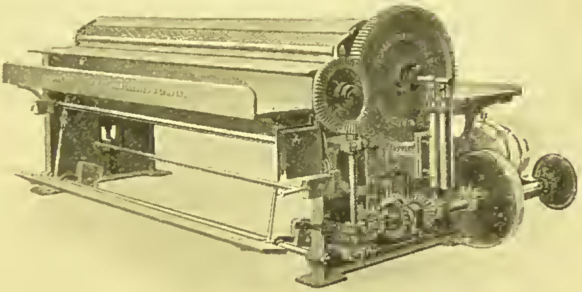

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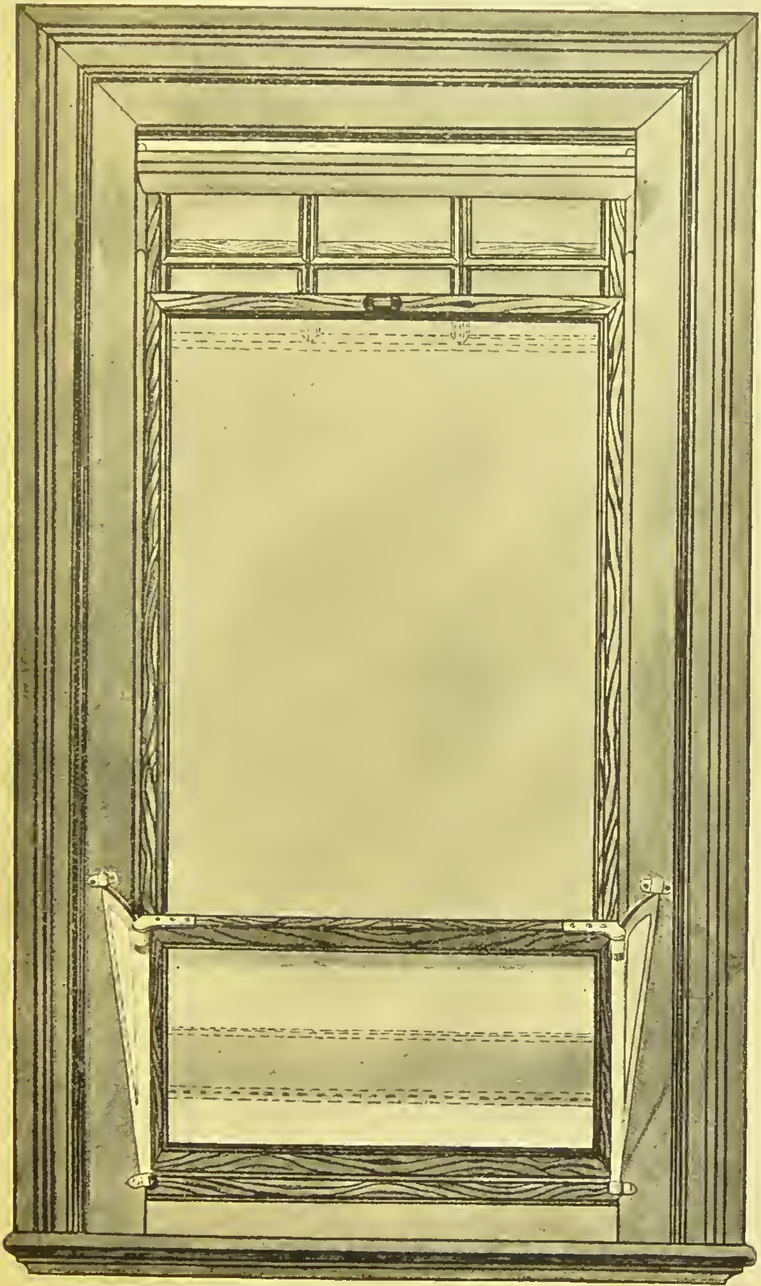

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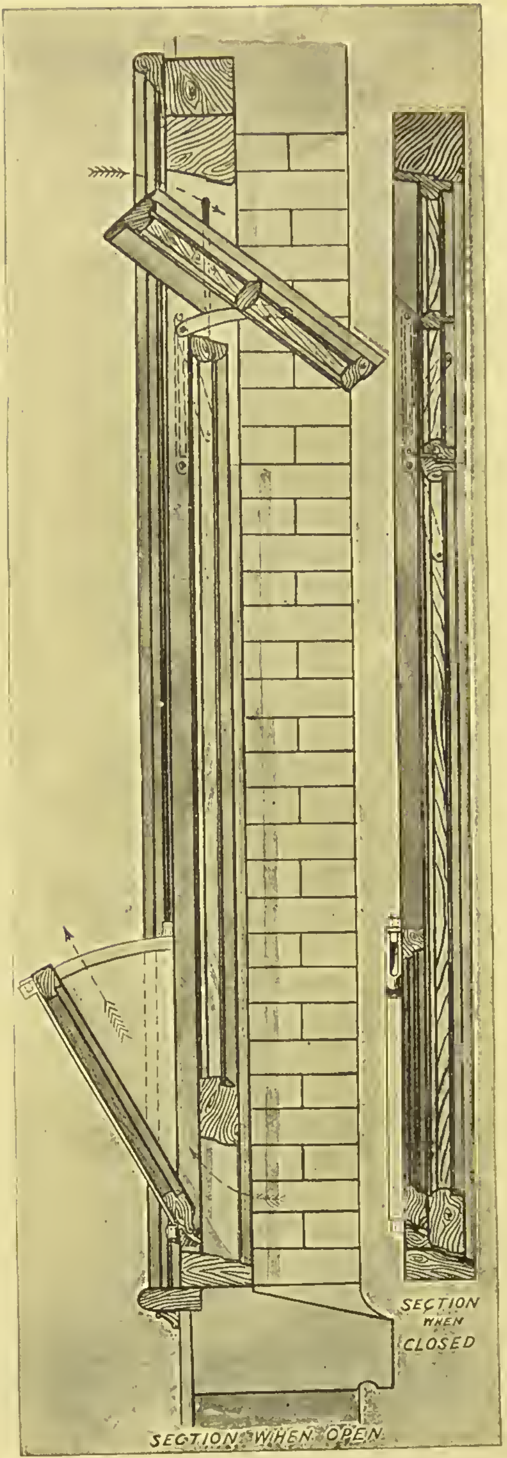

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Secretary's Office, London University.
Whiston Union Workhouse.
Northwich Union Workhouse.
Whiston Union Infirmary.
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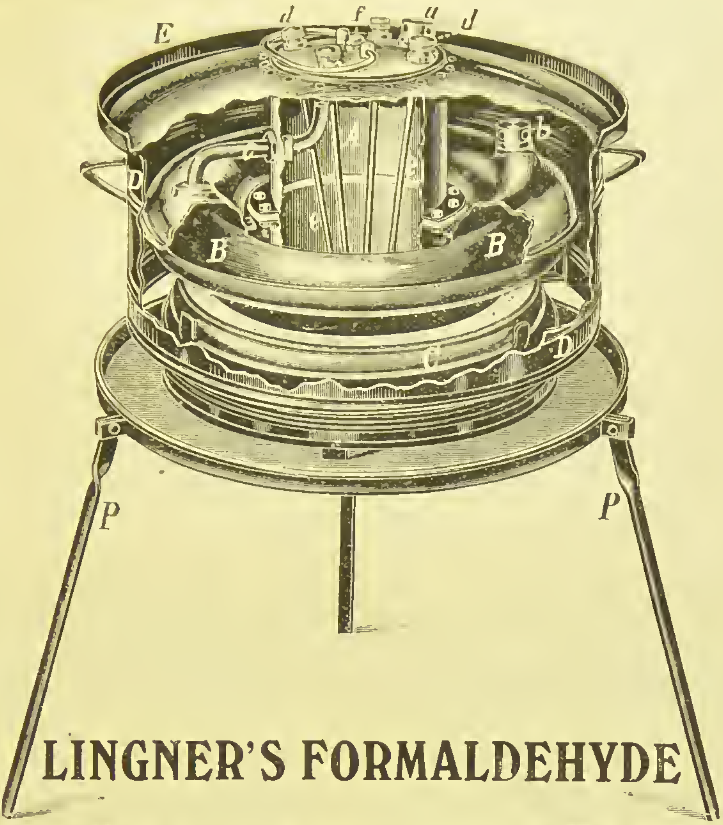

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